EHR Usability Toolkit

PAVING THE WAY FOR MEANINGFUL USE

Reference Manual

Support, Distribution:

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1. Welcome

Welcome to Turf, the EHR usability toolkit developed by SHARPC. Turf is the first all-in-one, integrated software program designed specifically for safety-enhanced design validation. You can use a variety of features for usability testing of an EHR, including Summative User Testing, Formative User Testing, Heuristic Evaluation, Expert Evaluation, Descriptive Analysis, Inferential Statistics, etc. Our toolkit streamlines User Testing and Heuristic Evaluation and generates reports in the format required for Safety Enhanced Design certification.

A unique feature of user testing in Turf is Autoflow. With Autoflow, you can semi-automate the testing process by prompting the user through selected tasks. Autoflow is fully customizable to specific task actions, including displaying text files, playing short video clips, capturing images, recording media and filling in forms. Customized moderation of Turf allows for a streamlined assessment of the user experience. In addition, Turf captures keystroke events and task execution times.

Turf also allows for quick and easy documentation of critical usability problems during the Heuristic Evaluation module. Expert evaluators can record a video to demonstrate violations of heuristic principles or capture screenshots that further define the problematic areas. Evaluators can then identify violations and actionable design concerns by clearly marking up the screen with a violation box.

Visit our website www.SHARPC.org for a free 30 day trial and experience the all-in-one integrated software system.

2. System Requirements

Please note that **administrator privileges** are **required** to install Turf 4.0.

Operating System:	**Windows® 8.1, and 10**
Prerequisites:	.NET framework version 4.5.3 or higher
Processor:	1 gigahertz (GHz) or faster
RAM:	4 GB or above
Free disk space:	250 MB (for application install only)
Screen Resolution:	Up to 1920 x 1080
User Access Control Privileges:	Local system administrator or higher

Note:

a) Turf 4.0 has been **tested** in **Window® 8.1 and 10**.
b) **The storage requirements depend on usage**. A typical recording with audio, video, and keystroke events will generate approximately 5-10MB data per minute. For seamless recording and playback, a dedicated video memory (GPU) is preferred.
c) **To use OneDrive functions,** an active Microsoft® Account with OneDrive® is required.

System requirements to install **Turf for Android** in your smartphone or tablet

Operating System:	**Android® 5.0 or higher**
Free disk space:	2 GB (to store the recorded video)

System Privileges:	Enable developer mode, USB debugging and install of third party apps.

Note:

a) Turf for Android in Turf 4.0 has been **tested** in **a Nexus® 9 device with Android® 5.0**.

b) **The storage requirements depend on usage**. Recording of android device screen is initially saved in the device. For this we recommend at least 2 GB of free space. To recover used space, the recordings can be manually deleted from the device once they are saved in Turf 4.0

3. Step by Step Guide

a) Download the Turf software (available as a zip archive) from the Turf website
b) Go to the extracted folder and click the Turf 4.0 Setup.msi file
c) Click **Next** to proceed
d) Read the Research and Evaluation License Agreement and accept the terms to proceed by marking the checkbox and clicking the **Next** button
e) Click **Next** to continue to install Turf
f) Choose if you want to install Turf for all users or just for you. Click the **Install** button to begin installation
g) Installation will begin and the process is indicated in the progress bar
h) When the installation is completed, click **Finish** to close the setup window

4. Turf Interface

4.1 Panels

4.1.1 Projects Panel

The **Projects** panel displays the list of all documents and folders, each user is working on separated by a **Heuristic Evaluation** project or a **User Testing** project. The **Add New Product** button allows the user to enter the name and version of the product, software, website or application they will be testing. Once the product has been created, it will show up in the **Projects** panel and new folders can be created that will organize the many documents and sessions. The folders are arranged in a tree fashion to allow for easy navigation and location of the correct folder.

4.1.2 Details Panel

The **Details** panel shows each individual files that are in the folders in the **Projects** panel. The documents can range from audio files, video files, imported PDFs, exported XML documents, screenshots, etc.

4.1.3 Heuristic Evaluation Problem Panel

The **Classify Problems** panel contains three features that streamline the heuristic evaluation process. The **New Problem** button allows a user to create a new problem and link it to multiple user-defined marks. The **Audit Problems** button allows a user to agree, archive, or discard saved problems in a chosen location. The **Rate Problems** button allows a user to rate approved or agreed upon problems.

4.1.4 User Testing Forms Panel

The **User Testing panel** contains four forms often used in user testing. The **Demographics** form has many fields for collecting background information about a user including experience and education. The **Usability Survey** form is a usability survey with numerous radio buttons that resembles the commonly used system usability scale (SUS). The **Moderator Notes** form provides a large space for a user testing moderator to record his observations and other notes. The **Performance Evaluation** form contains numerous metrics for gauging user performance during a task, including task time, task success, and path deviation.

4.2 Tab Functions in Turf

4.2.1 File Tab

The **File** tab in the Turf interface organizes and contains access to all files created during Turf sessions and those that have been imported for evaluation. It contains 5 buttons located on the left side of the Turf interface to help locate and navigate documents. The **Recent** button shows files, folders and projects the user has worked on most recently. Clicking the **About TURF** button will load a webpage where you would be able to watch different Turf video tutorials and learn more about the Turf software. The **Activate** button activates the full version of the product for legal use by the end user or enterprise. The **OneDrive** button allows you to log in to OneDrive and be able to view the files that you have already shared on OneDrive. The **Exit** button will immediately exit the Turf program.

4.2.2 Home Tab

The **Home** tab allows users to quickly create new **Projects**. Click on either the **Heuristic Evaluation** or **User Testing** button to begin creating each session.

TIP Before you click on **Heuristic Evaluation** or **User Testing** button, make sure you have added a new product by clicking on the **Add New Product** button in the **Projects** sidebar and make sure your new Product is selected before clicking a new Project.

4.2.3 Heuristic Evaluation Tab

The **Heuristic Evaluation** tab gives users the control to both organize folders, capture media and classify problems based on heuristic principles. Folders can be organized by clicking on the **New Folder**, **Edit Folder** and **Delete Folder** buttons represented by the yellow folder icons. Media can be captured in five different ways via **Audio**, **Video**, **Keystroke**, **Screen,** and Android buttons, either individually or in groups as decided by the user by checking or unchecking checkboxes assigned to each media type. **Settings** buttons for each media type allow for

deeper customization and show icons that reflect each type of media. According to heuristic principles, a **New Problem**, **Audit Problems** and **Rate Problems** buttons allow users to evaluate problems found in documents and screenshots with ease. A **Report** button with a printing icon allows users to print the problem descriptions, captured images, with or without marks, and the severity ratings for each problem.

4.2.4 User Testing Tab

The **User Testing** tab, similar to the **Heuristic Evaluation** tab, allows the user to assign folders and capture media. The **User Testing** tab, however, also has icons specific to its unique function that include forms for a testing session and **Autoflow**. The **Demographics** button brings up a mini tab with a sample form which a creator can add to an **Autoflow** session prompting the user to enter personal information. The **Usability Survey** button brings up a mini tab with questions for the user after the testing session. **Moderator Notes** button shows a mini tab that has a blank textbox for the moderator of the user testing session to record his or her thoughts. The **Performance Evaluation** button shows a form that a moderator can use to evaluate the results of the user testing session.

Autoflow, a customizable user testing process, is a format of testing that prompts the user through a testing procedure using a series of forms and media to record, evaluate and survey user performance. Clicking the **Set Up Autoflow** button brings up an **Autoflow** settings popup window where the moderator can create and edit the order and content of the testing session. Clicking **Run** will start the recording and the **Autoflow** session will begin.

4.2.5 Analyze Tab

The **Analyze** tab offers a plethora of features for analyzing heuristic evaluation and user testing data by statistical and more basic means. A user first selects the data using the Query Files button. The data is then displayed on a pivot table. Columns can be re-grouped or re-ordered by dragging and dropping columns as desired.

4.2.6 View Tab

The **View** tab allows the user to customize the window layout according to their preferences. The **Show Product Tree** checkbox will expand the list of products in the **Projects** panel to show all documents and files. The **Show Detail Panel** checkbox will display or hide the **Details** panel on the bottom of the Turf interface. The **Show Properties** checkbox will show or hide the **Property** panel on the right side of the Turf interface. Clicking the **Reset Window Layout** button will reformat all panels to revert to the default sizes and locations.

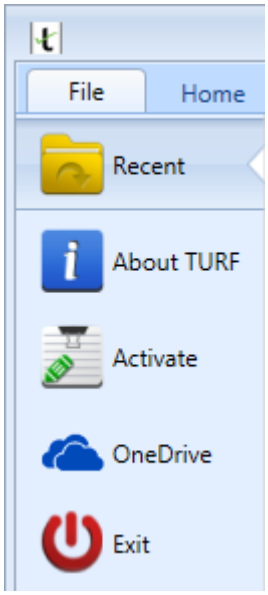
4.2.7 Settings Tab

The **Settings** tab allows the user to adjust the color theme of Turf and the high level content detail of the system configuration. Clicking on any of the different icons in the **Theme** box will change the color and font of all Turf windows and panels. Under the **System Configuration Management** panel on the left side, 8 different settings are available for modification and customization. The **Use Cases** setting allows users to create a **New Use Case**, create a New Folder to organize use cases, Modify old folders, Delete folders, and Upload different files to a use case. The **Descriptive Template** setting allows user to create a **New** template, **Load** another template from file,

Export a template from an XML document and **Delete** a template from the list. The **Widget Definitions** setting allows users to specify the type of the mark in heuristic evaluation by specifying Button, TextBox, Check Box, List Box or ComboBox for both Windows and Android systems. The **Color Definitions** setting allows users to specify Name, Color, and Description**.** The color can be set to active by checking the **Active check box** for both the Windows event color and the Mark property color from the dropdown menu list. The **Hot Keys** setting allows users to Modify Hotkey Value associated with the Home, Heuristic Evaluation, User Testing, Analyze, and View tabs by specifying the ActionName, Action, Hotkey, and status of the key using an Active checkbox. The **Video** settings allow users to specify the maximum number of video tabs that can be opened at the same time. **OneDrive** settings allow you to customize the way that you want Turf interact with your OneDrive account. The **Install Turf for Android** button allows you to install Turf on your android smartphone or tablet device.

4.3 Icons

4.3.1 File Tab Icons



The **File** tab is the welcome tab when the user first opens up Turf. It stays highlighted blue at all times to represent the main tab for finding recent files, folders and projects.

Recent - Shows all file types recently opened.

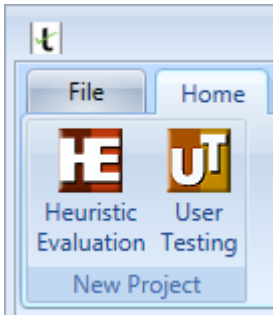
About TURF - Provide you with different Turf video tutorials

Activate - The **Activate** button shows activation information of the product for legal use by the end user or enterprise.

OneDrive - Shows the files/folders that you have uploaded to your OneDrive from your Turf application.

Exit – Closes Turf with a popup window to confirm.

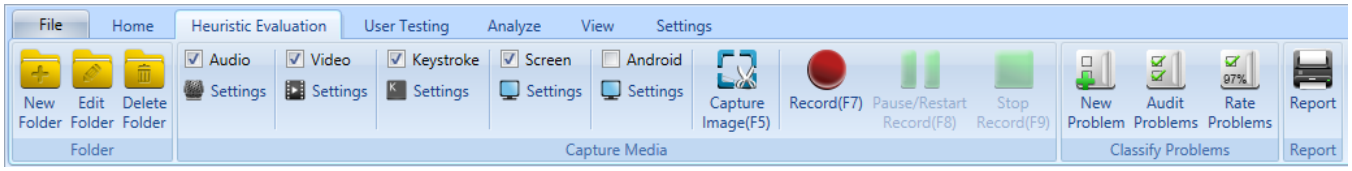
4.3.2 Home Tab Icons



Heuristic Evaluation - Opens a popup to create a **Heuristic Evaluation** project under a user chosen product folder.

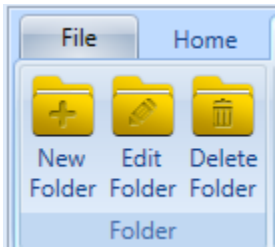
User Testing - Opens a popup to create a **User Testing** project under a user defined product folder.

4.3.3 Heuristic Evaluation Tab Icons



The **Heuristic Evaluation** tab has buttons and checkboxes that assist the user to identify and analyze heuristic violations using heuristic principles. The tab is divided into 4 sections: **Folder**, **Capture Media**, **Classify Problems** and **Report**.

4.3.3.1 Folder

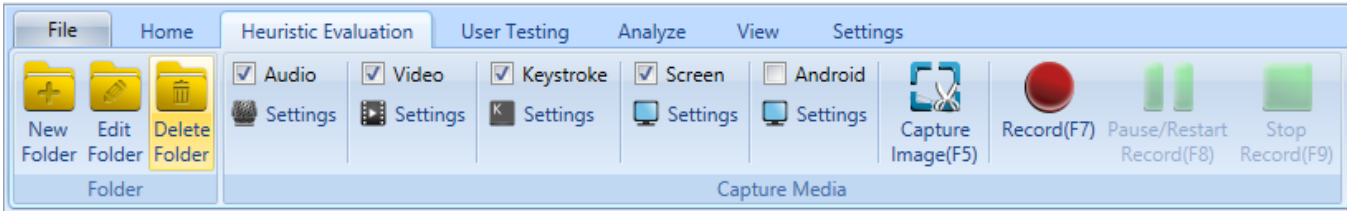


New Folder – Creates a new folder under the **Heuristic Evaluation** project name

Edit Folder – Renames the folder

Delete Folder – Deletes a folder in the project

4.3.3.2 Capture Media



Audio Settings – When checked, audio will be recorded through the microphone selected in the **Audio Settings** button.

Video Settings – When checked, video will be recorded using the webcam selected in the **Video Settings** button.

Keystroke Settings – When checked, capture events and capture controls are captured using the **Keystroke Settings** button.

Screen Settings – When checked, a screenshot or video of the display chosen in the **Screen Settings** is captured.

Android Settings – When checked, screenshots and events on the chosen android device will be recorded.

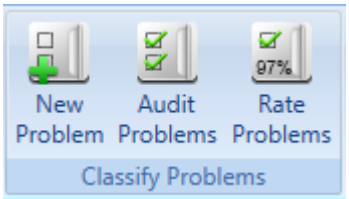
Capture Image (F5) – Captures the image on the monitor screen based on the parameters selected in the Screen Settings. The hotkey F5 can be also be used to capture an image.

Record (F7) – Records video of the screen as specified by the Screen Setting button. The hotkey F7 can also be used to start recording.

Pause/Restart Record (F8) – Pauses and restarts the recording. The hotkey F8 can be used to pause a recording and then restart the recording.

Stop Record (F9) – Stops and ends the recording. The hotkey F9 can be used to stop recording.

4.3.3.3 Classify Problems

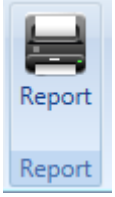


New Problem – The **New Problem** button allows a user to create a new problem and assign it to multiple images.

Audit Problems – Opens a popup where the user can choose which problem marks to audit and evaluate.

Rate Problems – Opens a popup where the user can choose which problem marks to rate using heuristic principles.

4.3.3.4 Report

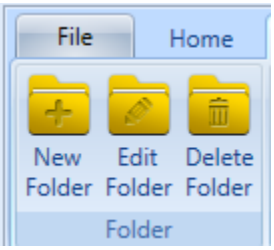


Report – Opens a popup where the user can select the problem descriptions, captured images, with or without marks, and the severity ratings for each problem to print out a report.

4.3.4 User Testing Tab Icons

The User Testing tab has buttons and checkboxes that assist the moderator in customizing and conducting user testing. The tab is divided into 4 sections: **Folder**, **Capture Media**, **Forms** and **Autoflow**.

4.3.4.1 Folder

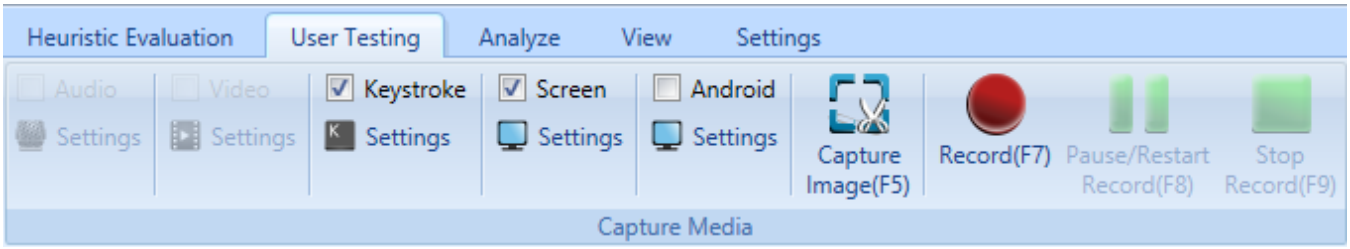


New Folder – Creates a new folder under the **User Testing** project name

Edit Folder – Renames the folder

Delete Folder – Deletes a folder in the project

4.3.4.2 Capture Media



Audio Settings – When checked, the audio will be recorded through microphone selected in the **Audio Settings** button.

Video Settings – When checked, video will be recorded using the webcam selected in the **Video Settings** button.

Keystroke Settings – When checked, capture events and capture controls are captured using the **Keystroke Settings** button.

Screen Settings – When checked, a screenshot or video of the display can be chosen in the **Screen Settings** is captured.

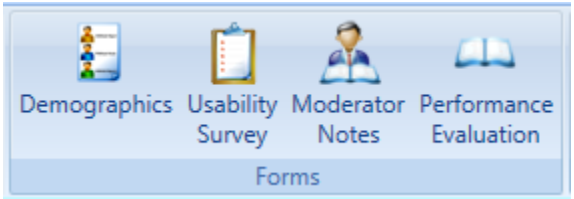
Capture Image (F5) – Captures the image on the monitor screen based on the parameters selected in the **Screen Settings**. The hotkey F5 can also be used to capture an image.

Record (F7) – Records video of the screen based on the parameters specified in the **Screen Setting**. The hotkey F7 can also be used to start recording.

Pause/Restart Record (F8) – Pauses and restarts the recording. The hotkey F8 can be used to pause a recording and then restart the recording.

Stop Record (F9) – Stops and ends the recording. The hotkey F9 can be used to stop recording.

4.3.4.3 Forms



Demographics – Opens a tab with a form containing boxes for a user to enter their demographics (e.g., **Full Name**, **Gender**, **Age**, etc.)

Usability Survey – Opens a tab with a survey containing radio buttons for a moderator to give to a user at the conclusion of a user testing session.

Moderator Notes – Opens a tab with a form containing a box where a moderator can add notes from the user testing session.

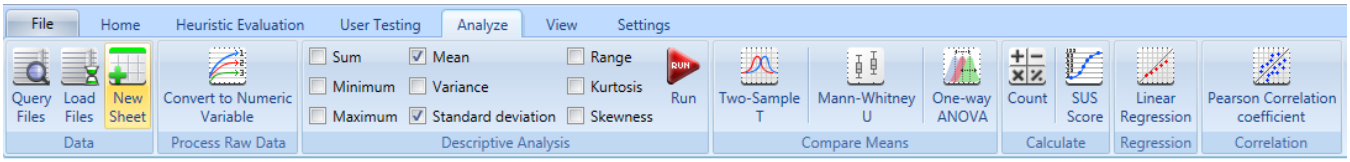
Performance Evaluation – Opens a tab with a form containing boxes and radio buttons for the moderator to enter values at the conclusion of the user testing session.

4.3.4.4 Autoflow

Set Up Autoflow – Opens a popup that allows creation and customization of an **Autoflow** session by choosing various contents specified in the designated dropdown list.

Run – Starts the **Autoflow** session.

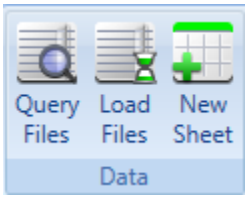
4.3.5 Analyze Tab Icons



The **Analyze** tab has buttons and checkboxes that perform detailed analytical functions on the heuristic evaluations and user testing data. The tab is divided into 7 sections: **Data**, **Process Raw Data**, **Descriptive Analysis**, **Compare Means**, **Calculate**, **Regression**, and **Correlation**.

The **Analyze tab** allows the user to query the data they collected and to analyze the data using statistical methods. The **Query Files** button brings up a pop-up dialog box with a tree view of all the products, projects, folders and files. Users can select files by the file type and the data will be displayed on the sheet. The **Load Files** button allows user to open the files with the following extension ".csv, .rtf, .xls, and xlsx" into the Turf and perform analytical functions on them. Click on the **New Sheet** button will create an empty sheet, users can enter their data manually or copy and paste data into this new sheet from other files, such as excel sheet. The **Convert to Numeric Variable button** will convert the selected data to the numeric type. Users can do simple descriptive analysis by checking the checkbox in front of the descriptive statistics and clicking the **Run** button. The **Two-Sample T** button brings up a pop-up dialog box which allows users to choose the grouping variable and test variable(s) from the variable(s) list and to run the Two-Sample T test by clicking the OK button. The **Mann-Whitney U** button brings up a pop-up dialog box which allows users to choose the grouping variable and test variable(s) from the variable(s) list and to run the Mann-Whitney U test by clicking the OK button. The **One-way ANOVA** button brings up a pop-up dialog box which allows users to choose factor and dependent variable(s) from the variable(s) list and to run the one-way ANOVA test by clicking the OK button. The **Count** button allows users to count the frequency of the selected item in the data. The **SUS Score** button allows users to calculate the SUS score from the original SUS survey data. The **Linear Regression** button brings up a pop-up dialog box which allows users to choose the factor and dependent variable(s) from the variable(s) list and run the linear regression by clicking the OK button. The **Pearson Correlation coefficient** button brings up a pop-up dialog box which allows users to choose the dependent variable(s) from the variable(s) list and run the Pearson Correlation coefficient by clicking the ***OK*** button.

4.3.5.1 Data

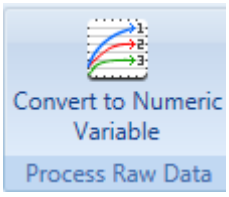


Query Files – Opens a pop-up dialog box with a tree view of all the products, projects, folders and files. User can select files by the file type and the data will be displayed in the sheet.

Load Files – Allows users to open the files with the following extension ".csv, .rtf, .xls, and xlsx" into the Turf and perform analytical functions on them

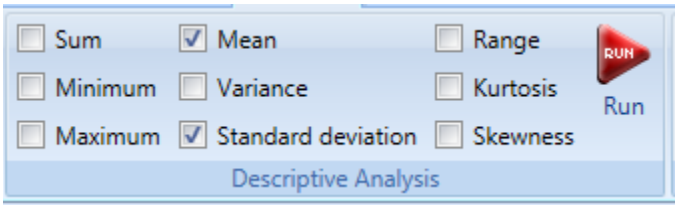
New Sheet – Creates an empty sheet, where users can enter their data manually or copy and paste data into this new sheet from other files, such as excel sheet.

4.3.5.2 Process Raw Data



Convert to Numeric Variable - Convert the type of the data to numeric

4.3.5.3 Descriptive Analysis



Sum – Adds all data values

Minimum – Finds the lowest data value

Maximum – Finds the highest data value

Mean – Finds the average of the data values

Variance – Measures how far a set of numbers is spread out.

Standard deviation – Shows how much variation or dispersion from the average exists.

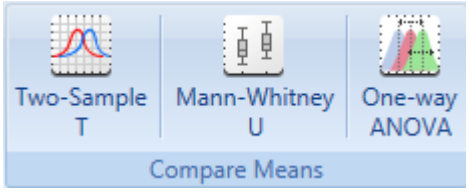
Range – Shows the difference between the largest and smallest values.

Kurtosis – Measures the "peakedness" of the probability distribution of a real-valued random variable.

Skewness – Measures the asymmetry of the probability distribution of a real-valued random variable about its mean.

Run – Analyzes the mathematical functions checked. Users can do simple descriptive analysis by checking the checkbox in front of the descriptive statistics and clicking the **Run** button.

4.3.5.4 Compare Means

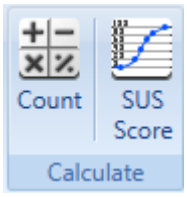


Two-Sample T – Determines if the mean of two sets of data are significantly different from each other. The null hypothesis is that the means of the two populations are equal.

Mann-Whitney U – A non-parametric test of the null hypothesis that two populations are the same.

One-Way ANOVA – Compares means of three or more samples, test the null hypothesis that samples in two or more groups are drawn from populations with the same mean values.

4.3.5.5 Calculate



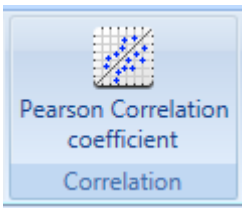
Count – Counts the frequency of the certain values in data.

SUS Score – Converts the responses of the 10 item questions to a SUS score.

4.3.5.6 Regression

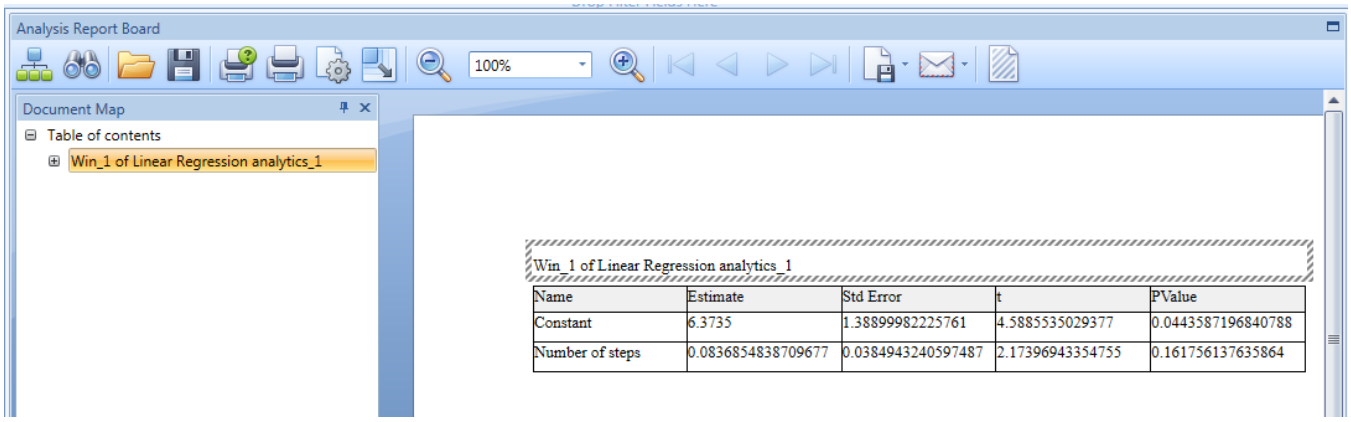
Linear Regression – Models the relationship between a scalar dependent variable y and one or more explanatory variables denoted X. The case of one explanatory variable is called simple linear regression.

4.3.5.7 Correlation



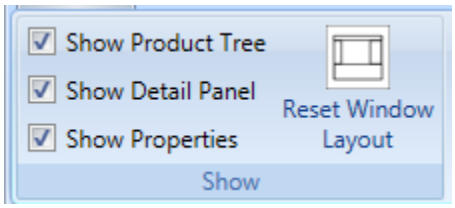
Pearson Correlation coefficient – It is a **measure of the strength of the association** between the two variables, giving a value between and including +1 and -1, where 1 is total positive correlation, 0 is no correlation, and -1 is a total negative correlation.

4.3.5.8 Analysis Report Board



Users can export their data and analysis results to the **Analysis Report Board** (storyboard). There you can view, search, load an external .XML file, save, print, export, Email and add watermark to the content in the analysis report board.

4.3.6 View Tab Icons



The **View** tab has a button and checkboxes to help the user configure the side panels. There is only one section, the **Show** section that provides control over the Turf interface.

4.3.6.1 Show

Show Product Tree – Shows or hides the Projects panel on the left side of the interface.

Show Detail Panel – Shows or hides the Detail panel on the bottom of the interface.

Show Properties – Shows or hides the Property panel on the right side of the interface.

Reset Window Layout – This button resets the panels to the original viewing setting.

4.3.7 Settings Tab Icons

The **Settings** tab has buttons and a panel to customize the Turf experience. It has one **Theme** section and one side panel, **System Configuration Management**.

4.3.7.1 Theme Icons

The **Theme** icon buttons change the color and font of the Turf interface during the duration of the Turf session. The user can choose from 14 unique themes to overlay the Turf interface.

4.3.7.2 System Configuration Management

Use Cases – Opens a tab for users to create and modify use cases.

Descriptive Template – Opens a tab that allows users to alter and customize the User Testing forms.

Widget Definitions – Opens a tab that allows users to specify the type of mark chosen during Heuristic Evaluation for both Windows and Android systems

Color Definitions – Opens a tab that allows users to customize the color for window event color and mark property color for Heuristic Evaluation and User Testing.

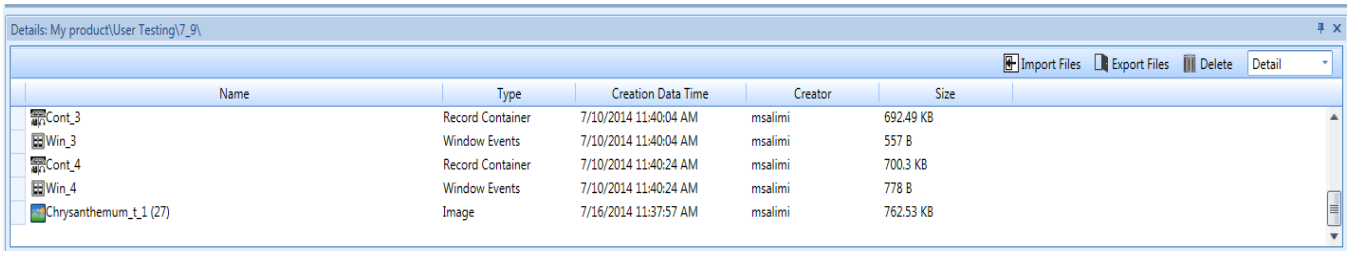
Hot keys – Opens a tab that allows users to choose and activate hotkeys for each of the 6 Turf tabs.

Video Settings– Opens a tab that allows users to specify the maximum number of video tabs that can be opened at the same time.

OneDrive Settings – Opens a tab that allows users to customize OneDrive related functions

Install Turf for Android – Opens a tab that allows users to install Turf Android app on their desired android device

4.3.8 Details Panel Icons



The **Details** bar is located on the bottom of the Turf interface and organizes the varying files contained in each project folder. It can be temporarily hidden by clicking the black push pin in the top right of the bar. To promote organizations it orders the details of the files by **Name**, **Type**, **Create Data Time, Creator** and **Size**.

Import Files – Opens a popup window where users can select any file type to upload to Turf.

Export Files – Opens a popup window where the user selects which folder to export the document(s).

Delete – Deletes the selected file.

Dropdown box – Allows the user to choose the file view in the tab in either tree, detail or thumbprint format.

Image Files – Blue and green landscape icon represents the image files

Video – Black and white icon with a headphone and movie reel represents video files

5. Media Capture Procedures

5.1 Adjusting Settings

Turf allows for customization of recording media settings, allowing the user to choose what type of media to capture and specify the settings to their individual case and need.

5.1.1 How to Adjust Audio Settings

The **Audio Settings** checkbox and icon allows the user to decide whether or not to record audio from the user testing session. When clicked, the microphone icon opens a popup where the user can click on a dropdown menu to choose which **Microphone**, if any, they would prefer to use for the recording. If many microphones are attached to the computer, this dropdown will have all those that are recognized and ready for record. If not, the default computer microphone, (if available) will be used.

5.1.2 How to Adjust Video Settings

The **Video Settings** checkbox and icon provides the user with the option to opt out of using the webcam. Clicking on the filmstrip icon for video settings opens a popup where users can choose their own options for **Webcam Device**. If many webcams are connected to the computer, the user can choose their webcam from the dropdown menu. Also, the user can assign different qualities to video files by checking on the any of radio buttons listed in the "**Quality"** section.

5.1.3 How to Adjust Keystroke Settings

The **Keystroke Settings** checkbox and icon allows the user to decide whether to Capture Event(s) and/or **Capture Controls**. **Keyboard Events** captures keystrokes on the keyboard. **Mouse Events** capture mouse clicks and scrolls. Users can choose to use **MSAA** (Microsoft Active Accessibility) or **UI automation** (user interface automation) in full or compact mode. To complete capturing keystroke controls, users can either **Capture Widget Container Structure** or **Capture the image of the control under each event**.

5.1.4 How to Adjust Screen Settings

To adjust **Screen Settings**, choose which **Monitor**, **Region** and **Quality** of the screen you wish to capture. Clicking on **Identify Monitors** briefly shows a large number on the screen of the Turf assigned monitor number if more than 1 monitor is connected. Clicking on **Customize Region** minimizes Turf and allows the user to highlight their specified region to record or capture by dragging the red dashed line to encircle the desired area of the screen. The **Minimize Turf** checkbox will minimize and open Turf when the **Capture Image (F5) is clicked** or keep Turf minimized when the **Record (F7)** button is clicked. The **Delay (sec)** checkbox issues a countdown on the screen until Turf either captures a screenshot or begins recording. The **Display immediately after Capture** checkbox

immediately brings up the image or video just captured in the large tab screen and also in the **Details** tab. The **Show mouse hot spot** check box shows the spot of the mouse on the screen. The radius and color of the spot can be set in the corresponding boxes. You can modify the quality (and file size) of image(s) or video(s) captured in Turf by checking on the corresponding radio buttons specified in the **Quality** section.

5.1.5 How to Adjust Android Settings

The Android Settings checkbox and icon allows the user to capture the screen and events of an android device running Turf application.

5.1.6 How to Capture an Image

To capture an image, the **Screen Settings must be configured**. The **Screen Settings** icon opens a popup window where the user selects the monitor screen to capture, the region of the screen to capture and the quality of the image(s) to be captured. Click **OK** to save changes and close the popup and click **Capture Image (F5)** to take a screenshot.

5.1.7 How to Record Video

To record a video, first configure settings by clicking on the **Video Settings** button, specifying the webcam, and choosing the desired video quality.

6. Heuristic Evaluation Procedures

6.1 Launch and Set Up a New Heuristic Evaluation Project

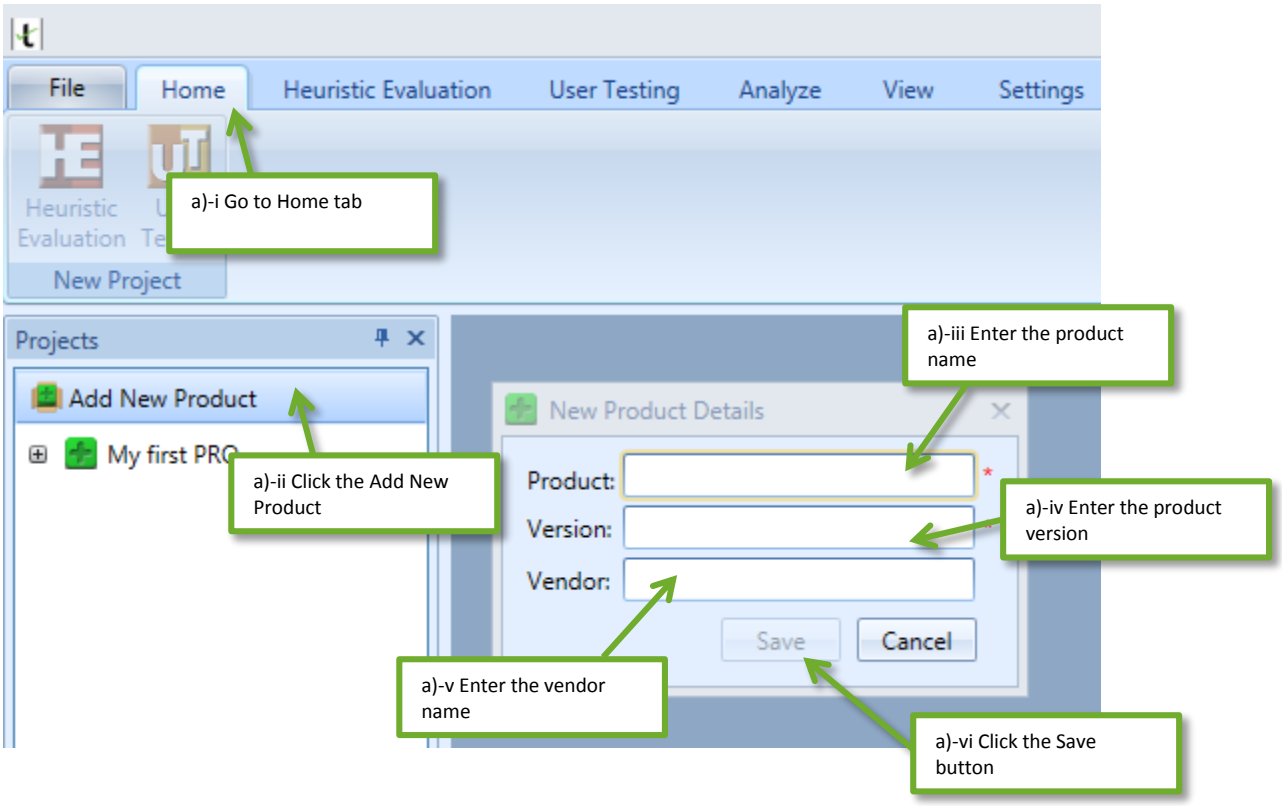
6.1.1 Launch Turf

After loading the software on the computer, a user will launch Turf by double clicking on the Turf desktop icon. Then the user will see the File interface where she can create a new product for the heuristic evaluation.

6.1.2 Create a New Product

a) Create a new product evaluation folder

i) Go to **Home tab**
ii) Click the **Add New Product**
iii) **Enter** the product **name** (e.g., Alpha)
iv) **Enter** the product **version** (e.g., Alpha)
v) **Enter** the vendor **name** (e.g., SharpC)
vi) Click the **Save** button

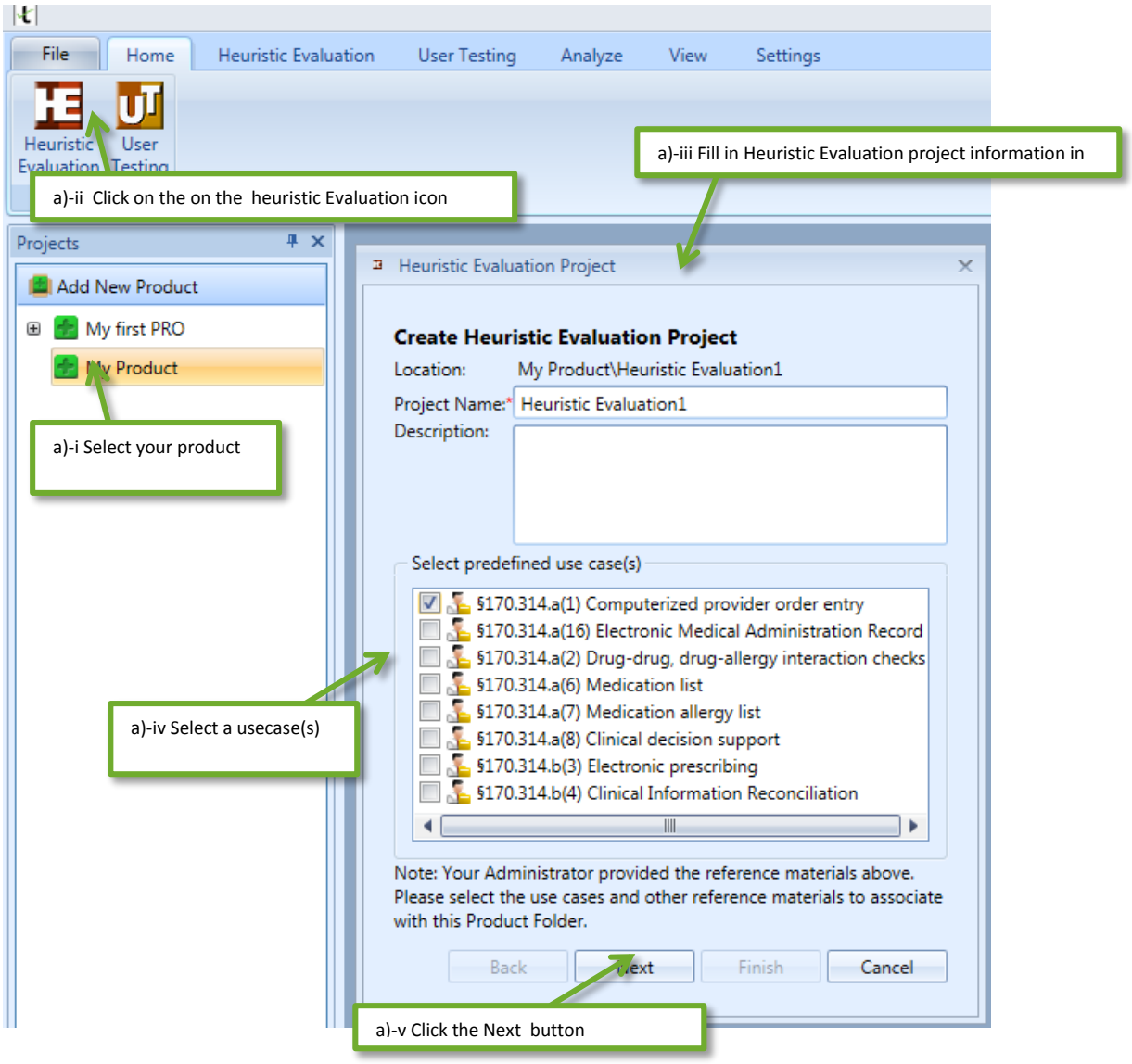


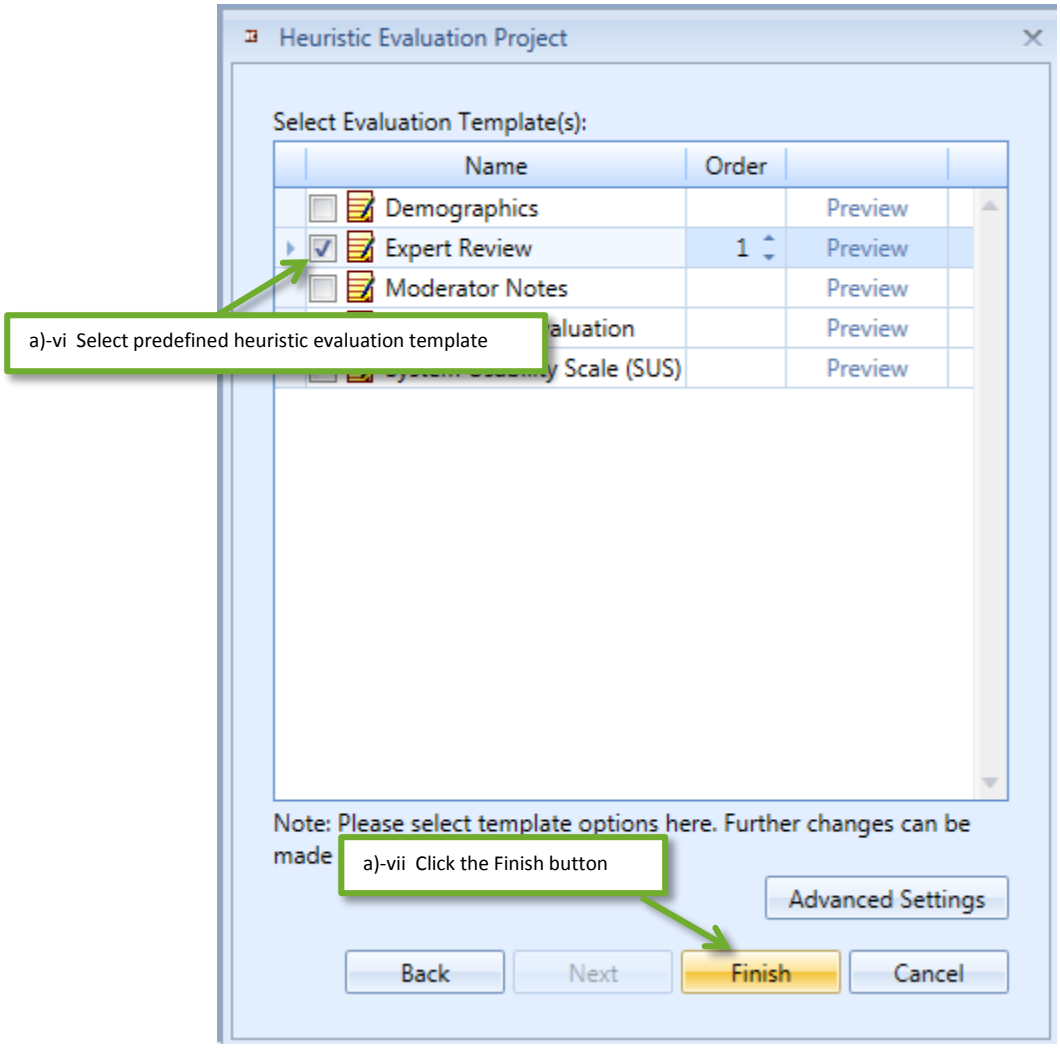
6.1.3 Set up a New Heuristic Evaluation Project Folder

After you set up a new product, choose the type of usability method (e.g., Heuristic Evaluation or User Testing) to conduct. In this case, choose Heuristic Evaluation.

a) Create a heuristic evaluation project

i. Select your product
ii. **Click** on the **Heuristic Evaluation icon**
iii. **Fill in** Heuristic Evaluation project **information** in the pop-out window
iv. Select a usecase (s)
v. Click the **Next** button
vi. **Select** predefined heuristic evaluation template (e.g., select Expert Review)
vii. Click the **Finish** button


File
Home
Heuristic Evaluation
User Testing
Analyze
View
Settings
Heuristic Evaluation
User Testing
a)-ii Click on the on the heuristic Evaluation icon
a)-iii Fill in Heuristic Evaluation project information in
Projects
Add New Product
My first PRO
My Product
a)-i Select your product
Heuristic Evaluation Project
Create Heuristic Evaluation Project
Location: My Product\Heuristic Evaluation1
Project Name:* Heuristic Evaluation1
Description:
Select predefined use case(s)
§170.314.a(1) Computerized provider order entry
§170.314.a(16) Electronic Medical Administration Record
§170.314.a(2) Drug-drug, drug-allergy interaction checks
§170.314.a(6) Medication list
§170.314.a(7) Medication allergy list
§170.314.a(8) Clinical decision support
§170.314.b(3) Electronic prescribing
§170.314.b(4) Clinical Information Reconciliation
a)-iv Select a usecase(s)
Note: Your Administrator provided the reference materials above. Please select the use cases and other reference materials to associate with this Product Folder.
Back
Next
Finish
Cancel
a)-v Click the Next button



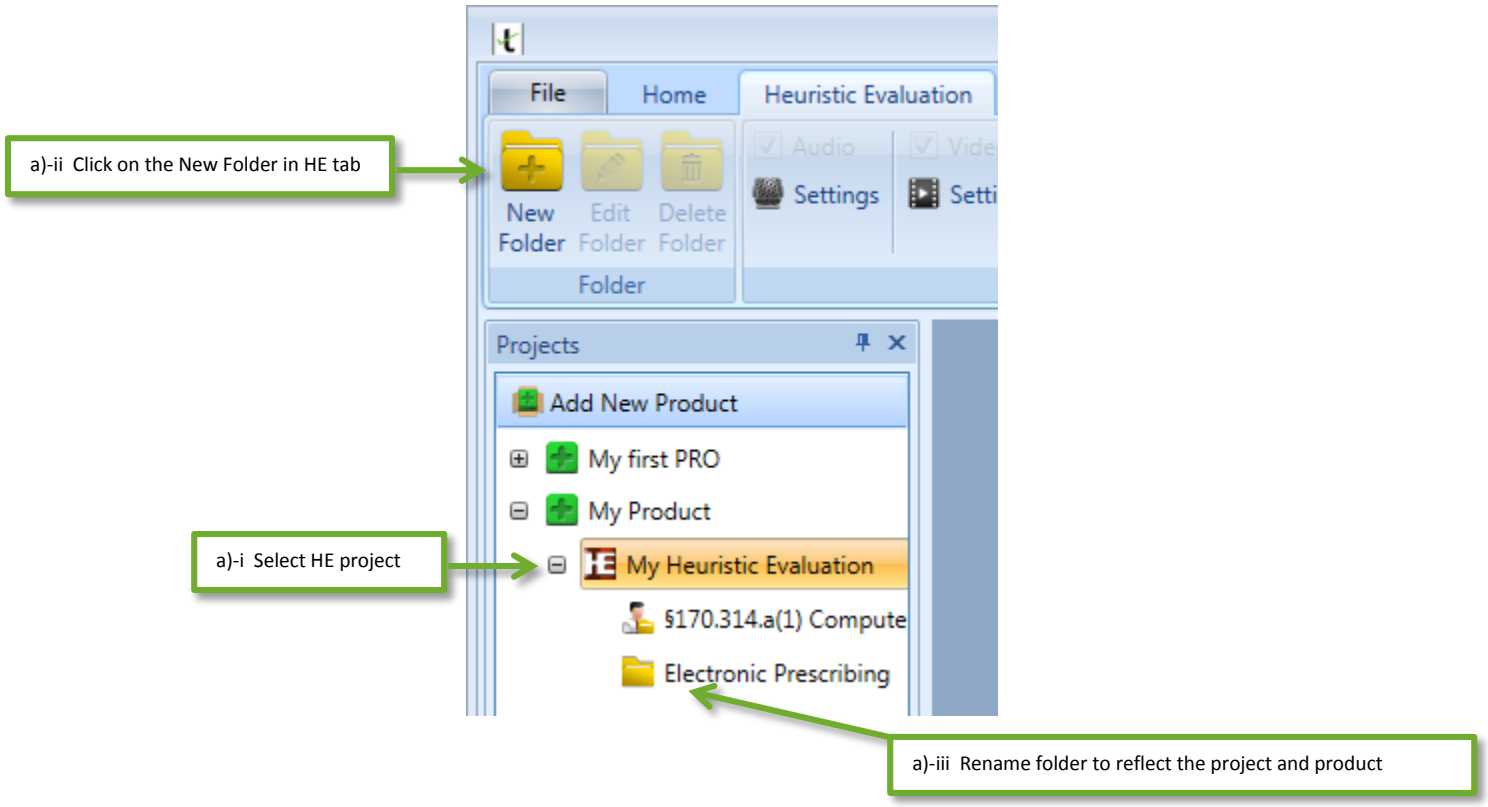
6.2 Capture a Screen Shot and Physically Mark Problems

6.2.1 Capture a Screen Shot

Screenshots can be captured to inspect interface design violations. **First**, **you need to create a folder**. You can create a folder to hold all of the evaluation projects on a product. For example, you may want to test multiple tasks (e.g., e-prescribing, creating a patient record and medication reconciliation) for a single EHR (electronic health record) product.

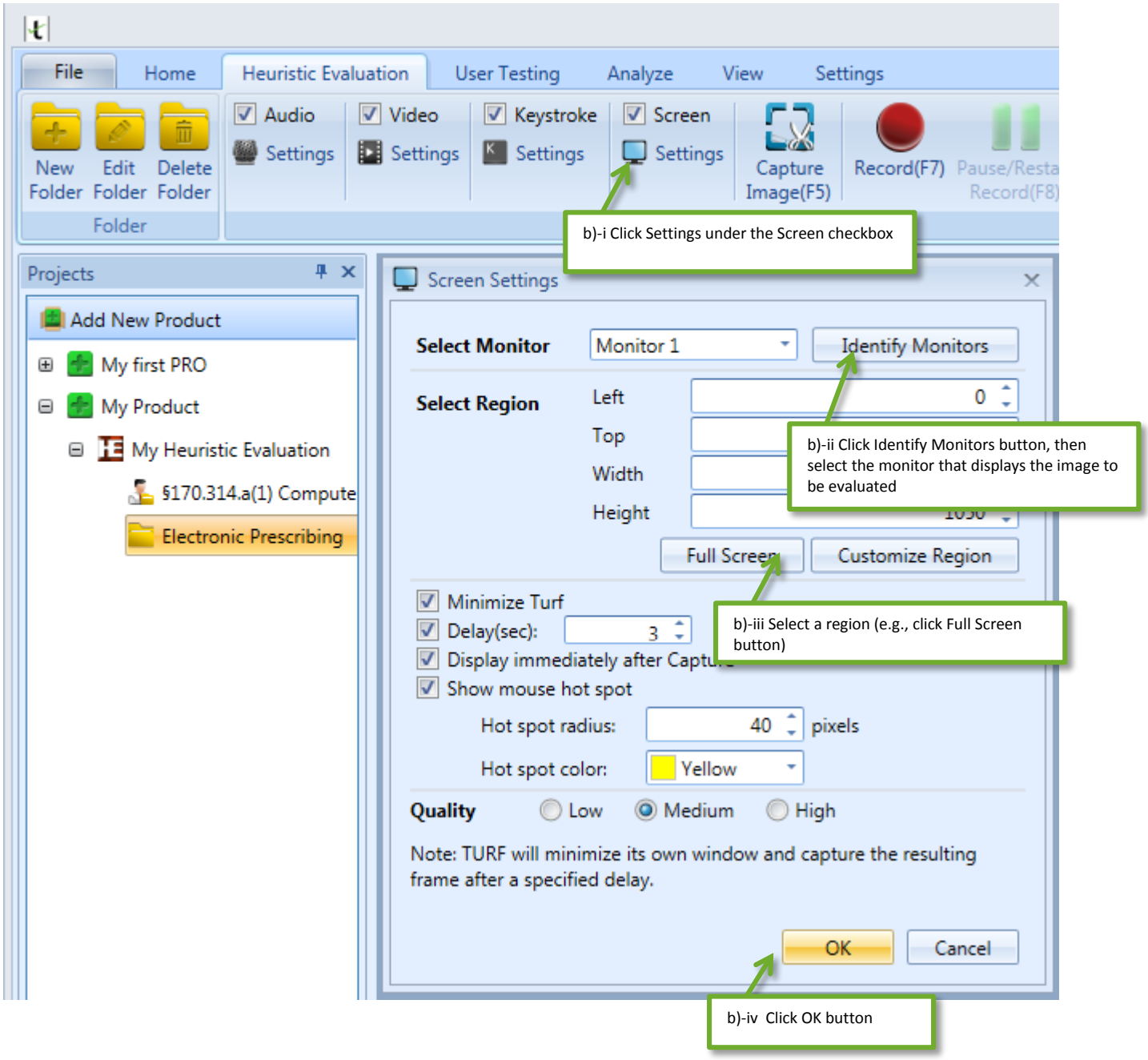
a) Create a new folder

i. **Select** the HE project
ii. Click on **New Folder** in the Heuristic Evaluation tab
iii. **Rename** the folder to reflect the project and product (e.g., HE SharpC EHR)



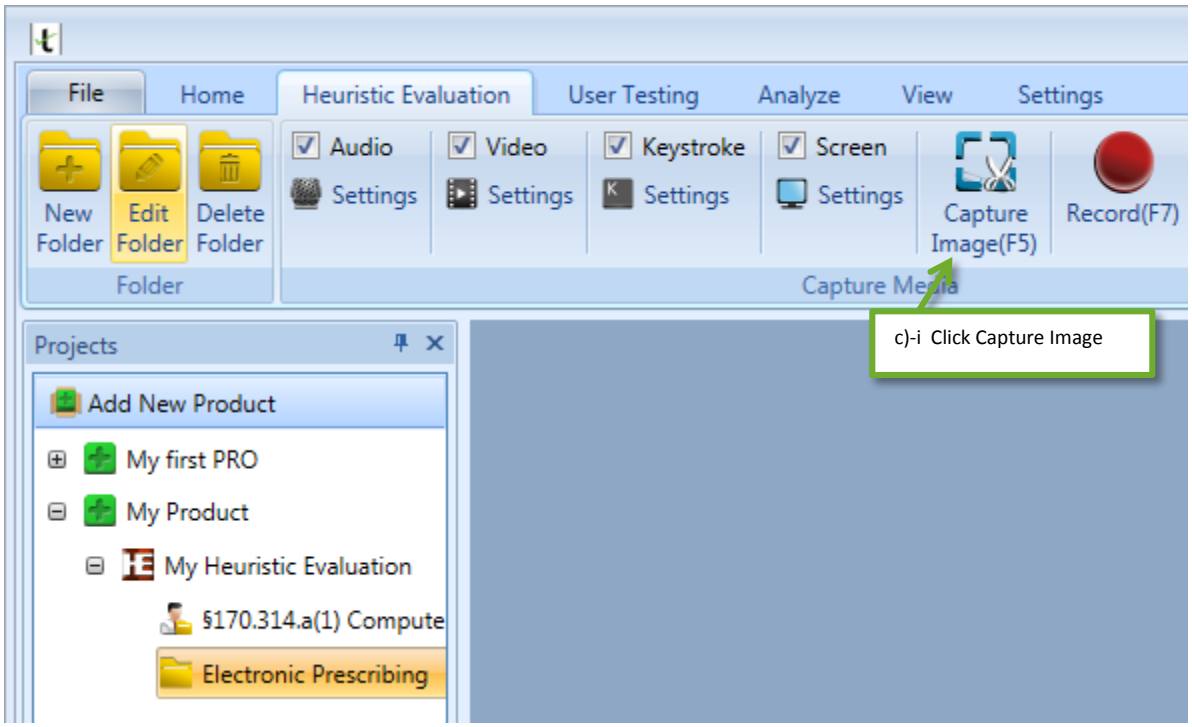
b) Configure Screen Settings

i. Click **Settings** under the Screen checkbox
ii. Click **Identify Monitors** button, then select the monitor that displays the image to be evaluated
iii. **Select** a region (e.g., click Full Screen button)
iv. Click **OK** button



c) Capture Image

i. Click the Capture Image (or press F5 on the keyboard), (e.g., Click the Capture Image (F5) button to capture the Medication Search screen)



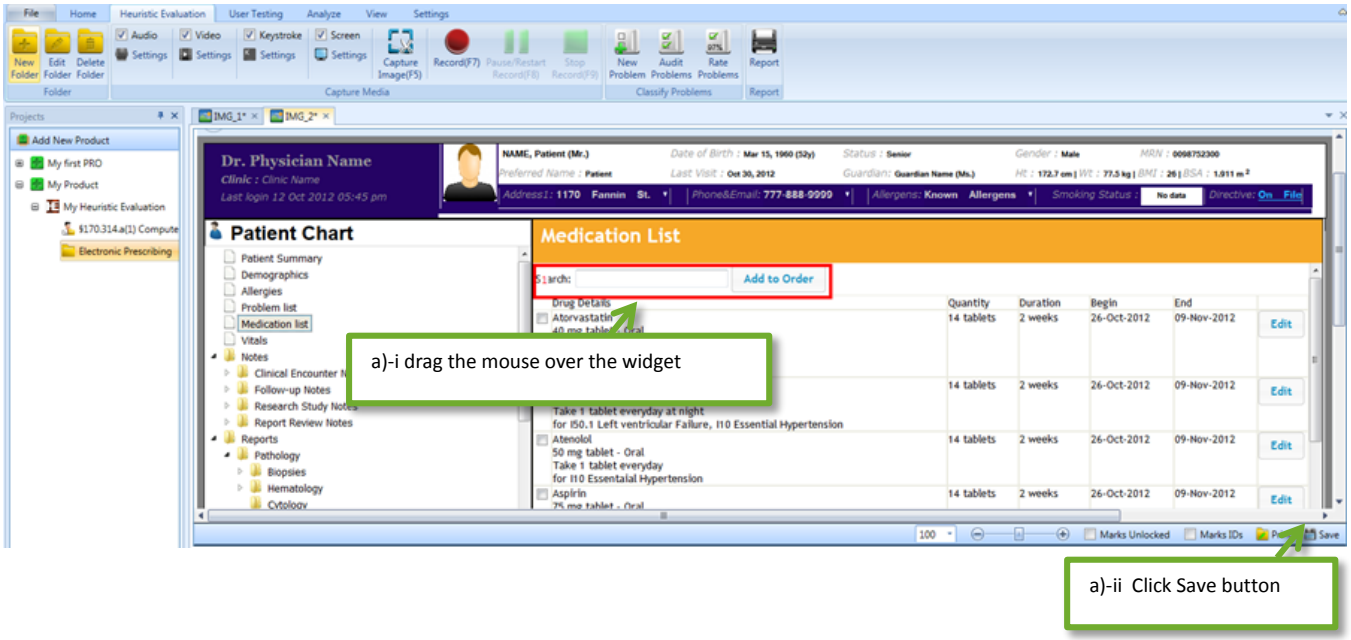
6.2.2 Physically Mark Problems

After you inspect the user interface, drag the mouse over the problematic widget to mark it on the screenshot.

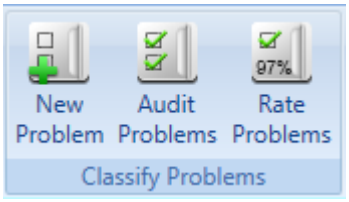
a) Mark a Problematic Widget

i. To mark the problem, **drag the mouse over the widget** (e.g., mark the medication search textbox)

ii. Click **Save** to save the mark



6.3 How to classify problems



6.3.1 New Problem

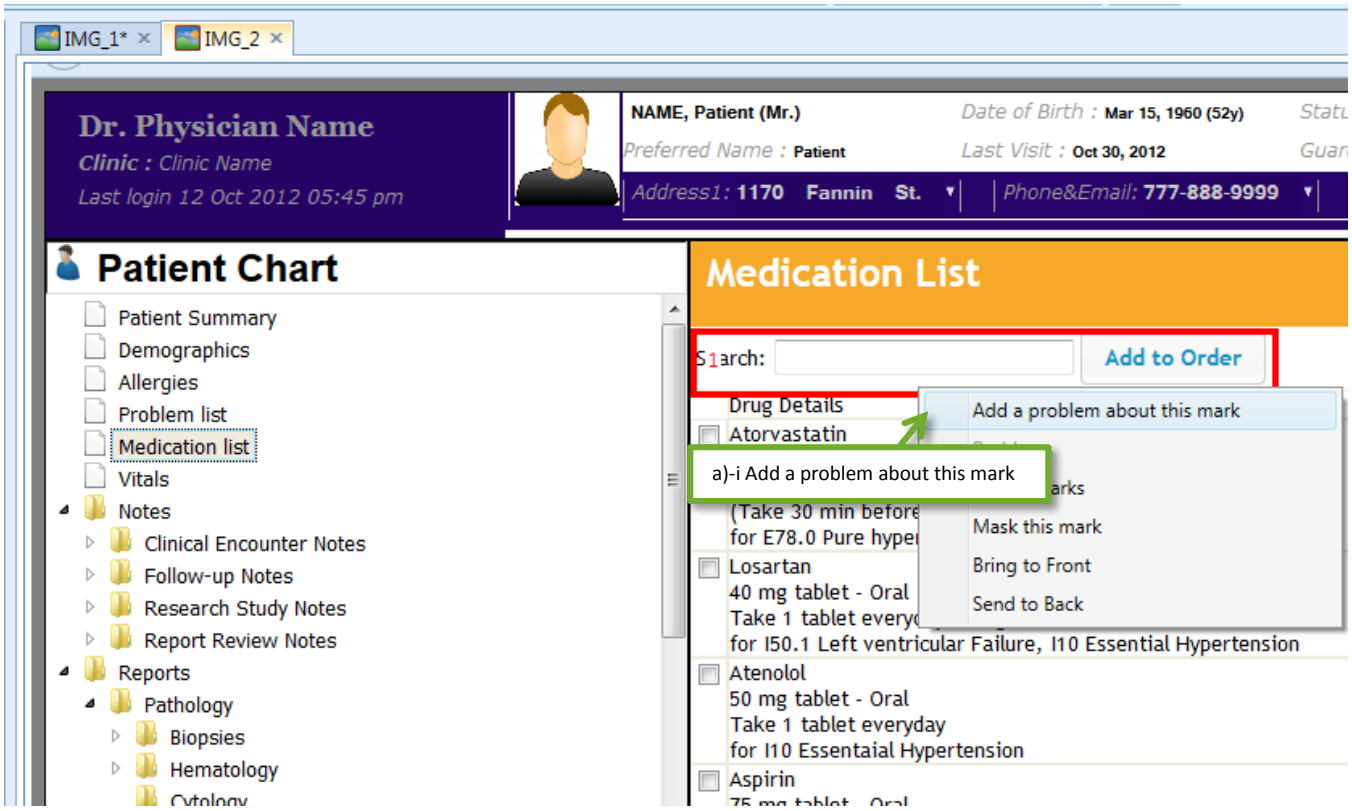
This button creates a new problem file form and allows a user to assign design violation to user-defined marks. After selecting the marks, the location can be further specified in the Problem Location field. The Problem Description field provides a space for describing the heuristic violation in detail. The Design Violation field contains options to specify the heuristic being violated. There are two methods to perform this task:

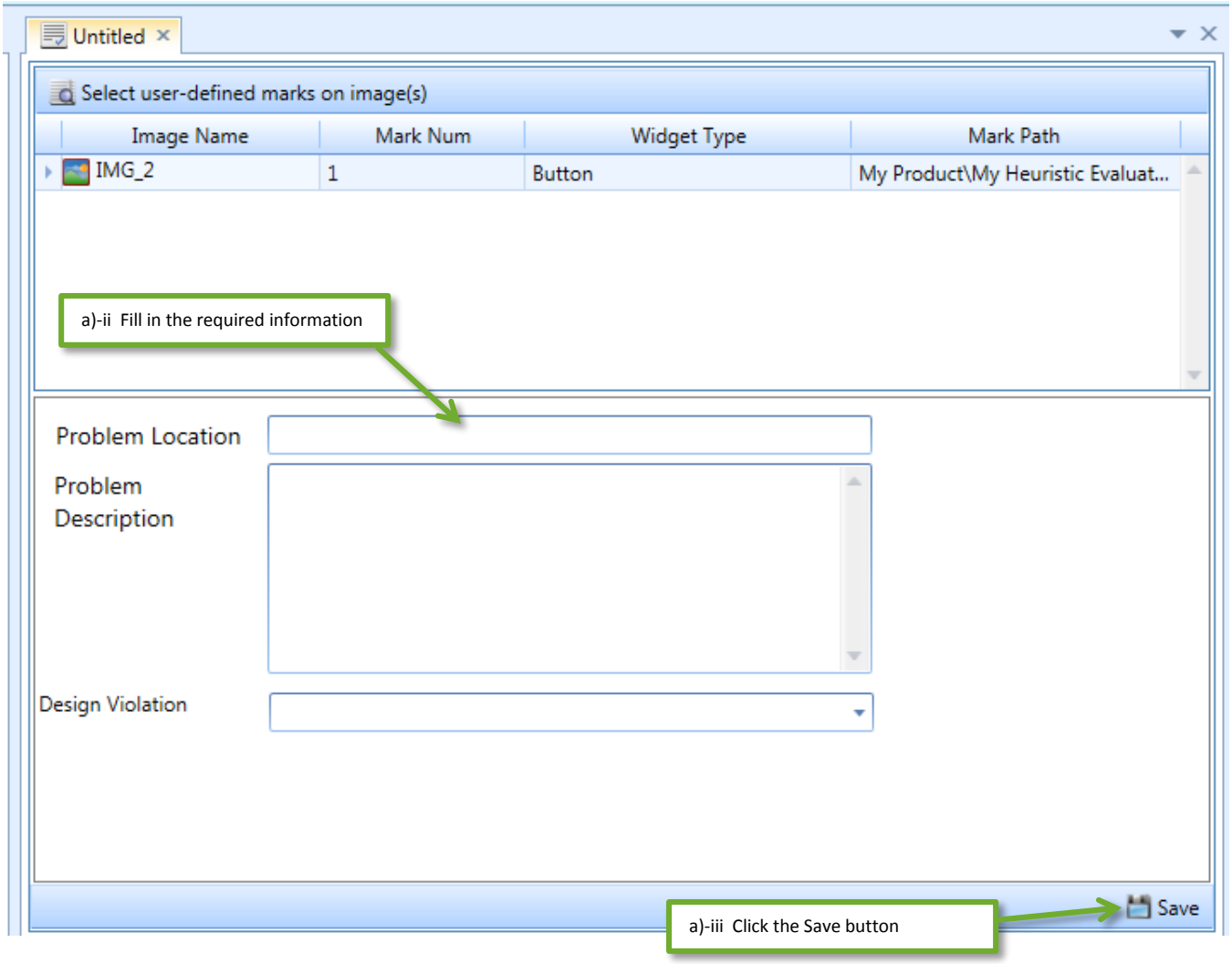
a) Method 1

i. With your mouse on the marked problem, right click on the mark, and then left click to select the “Add a problem about this mark” option.

ii. A problem description form is open. Fill in the required information

iii. Click the Save button at the bottom right of the screen


IMG_1*
IMG_2
Dr. Physician Name
Clinic : Clinic Name
Last login 12 Oct 2012 05:45 pm
NAME, Patient (Mr.)
Date of Birth : Mar 15, 1960 (52y)
Preferred Name : Patient
Last Visit : Oct 30, 2012
Address1: 1170 Fannin St.
Phone&Email: 777-888-9999
Patient Chart
Patient Summary
Demographics
Allergies
Problem list
Medication list
Vitals
Notes
Clinical Encounter Notes
Follow-up Notes
Research Study Notes
Report Review Notes
Reports
Pathology
Biopsies
Hematology
Medication List
Search:
Add to Order
Drug Details
Atorvastatin
Add a problem about this mark
a)-i Add a problem about this mark
Mask this mark
Bring to Front
Send to Back
Losartan
40 mg tablet - Oral
for I50.1 Left ventricular Failure, I10 Essential Hypertension
Atenolol
50 mg tablet - Oral
Take 1 tablet everyday
for I10 Essentaial Hypertension
Aspirin



b) Method 2

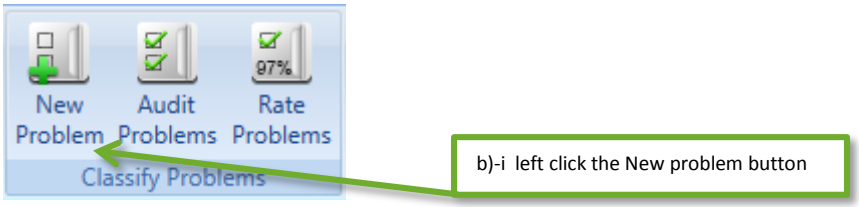
i. Left click the New problem button from the menu panel, this will open a new screen
ii. Left click on "Select user defined marks on image (s)" at the top of the screen

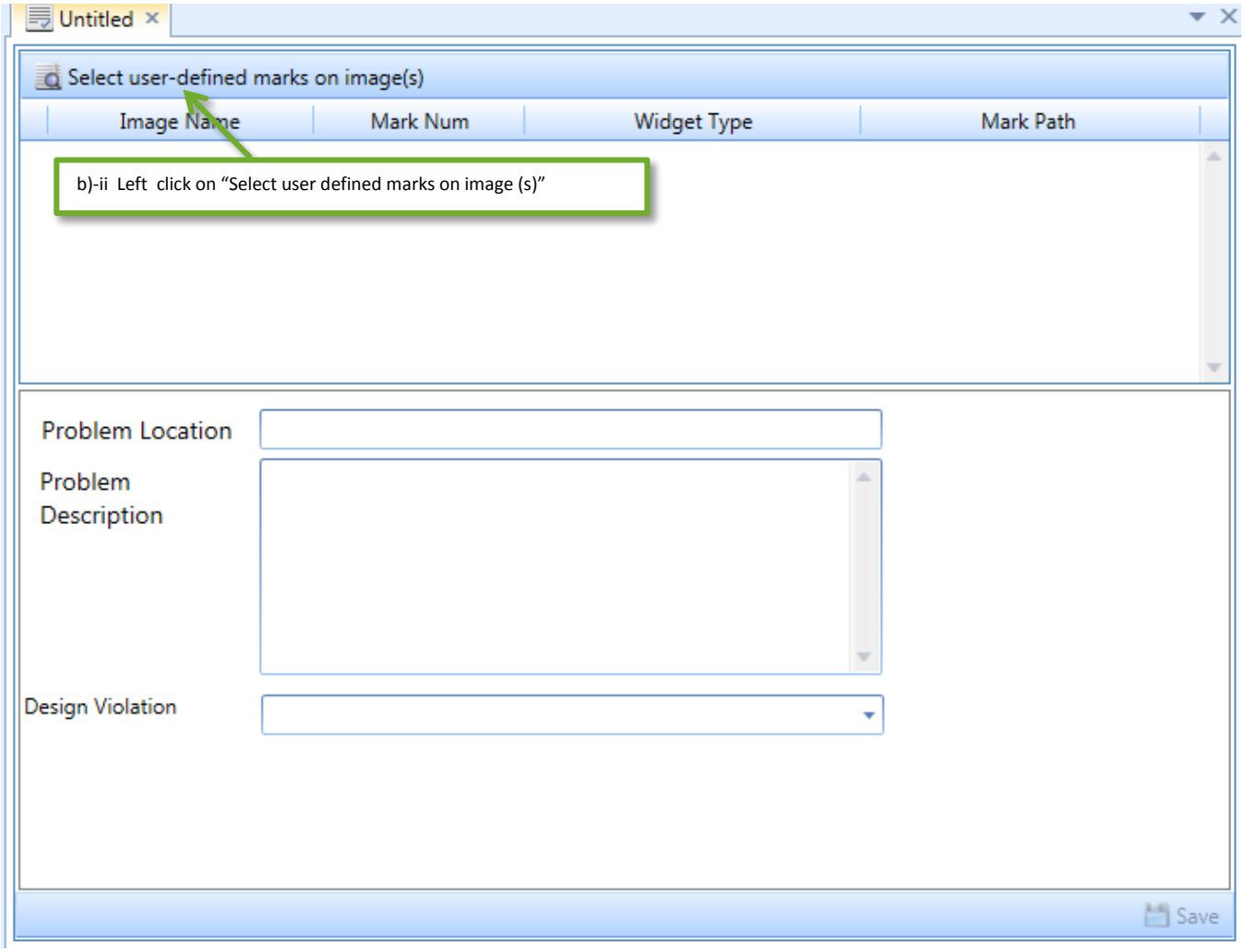
This opens a pop up window that shows all marks on the system. You must limit the scope for the problem description by identifying which marks or widgets this description should be attributed to.

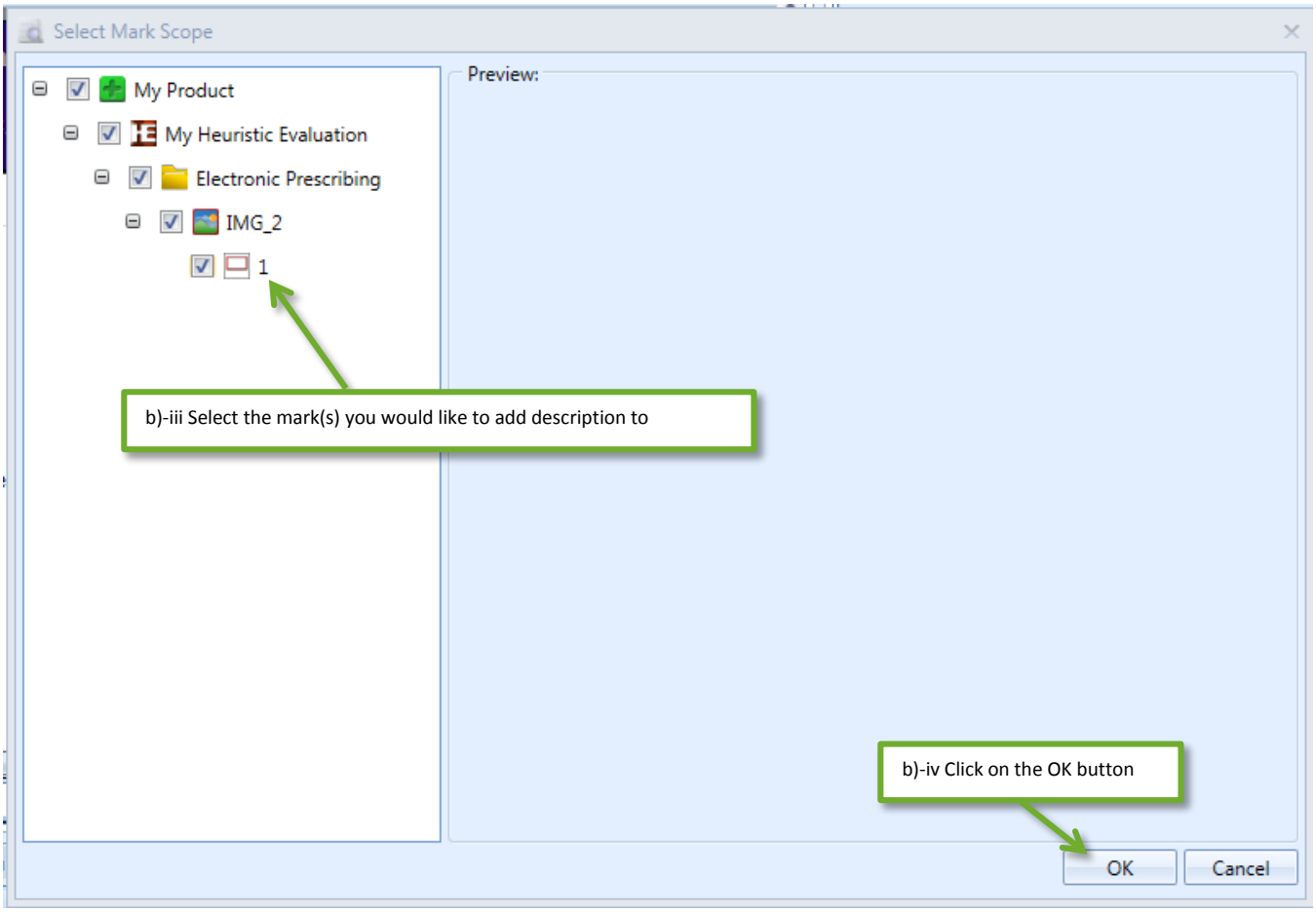
iii. Select the mark(s) you would like to add description to
iv. Click on the OK button

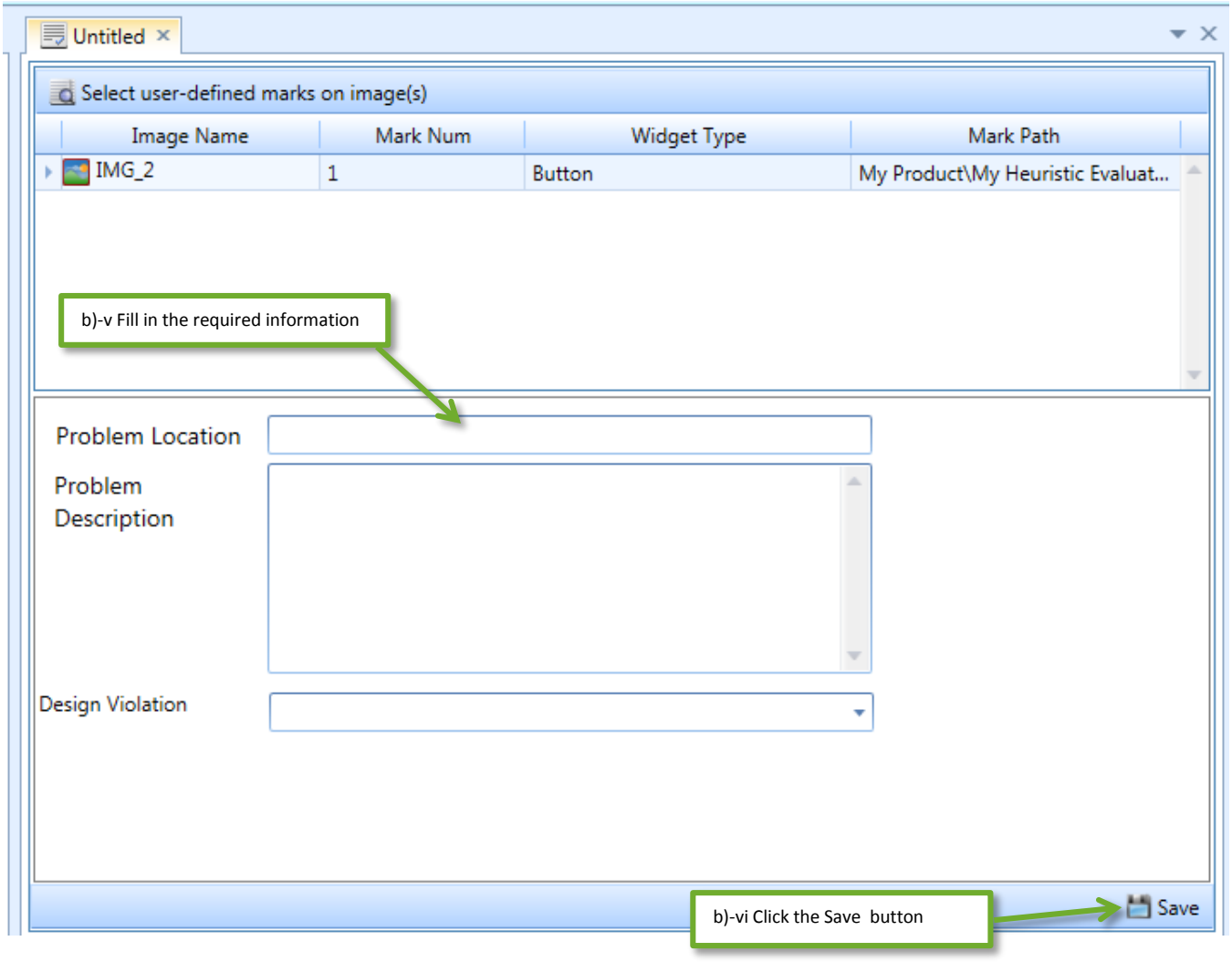
Once clicked, a single problem description form is opened. The items displayed on this form are determined by what is built into your template. In our form, we included problem location, problem description, and design violation.

v. Fill in the required information
vi. Click the Save button at the bottom right of the screen


New Problem
Audit Problems
Rate Problems
97%
Classify Problems
b)-i left click the New problem button


Untitled
Select user-defined marks on image(s)
Image Name
Mark Num
Widget Type
Mark Path
b)-ii Left click on "Select user defined marks on image (s)"
Problem Location
Problem Description
Design Violation
Save


Select Mark Scope
My Product
My Heuristic Evaluation
Electronic Prescribing
IMG_2
1
Preview:
b)-iii Select the mark(s) you would like to add description to
b)-iv Click on the OK button
OK
Cancel



Note: The design violation list can be modified by the system administrator. See Section 9 of this manual. After entering all the information, please save using the Save button at the bottom.

6.3.2 Audit Problem

This button displays an Audit Problem tab that allows users to approve, discard, or archive problems. A user must first choose problems to evaluate by selecting a location in the Project Tree. The problems list display can be filtered using the checkboxes at the top. Unclassified problems will have a yellow-orange color that will change colors upon classification. There are three options for classification: archive, agree, and discard. Selecting the archive radio button will save the problem for later consideration and the color will change to purple after saving. Choosing the agree radio button will allow the problem to be rated and change the color to green after saving. Clicking the discard radio button will prevent the problem from being rated and displayed on the report. The color will change to gray after saving. Please be sure to save once you've chosen an option.

a) Audit Problem

i. Select the correct user folder

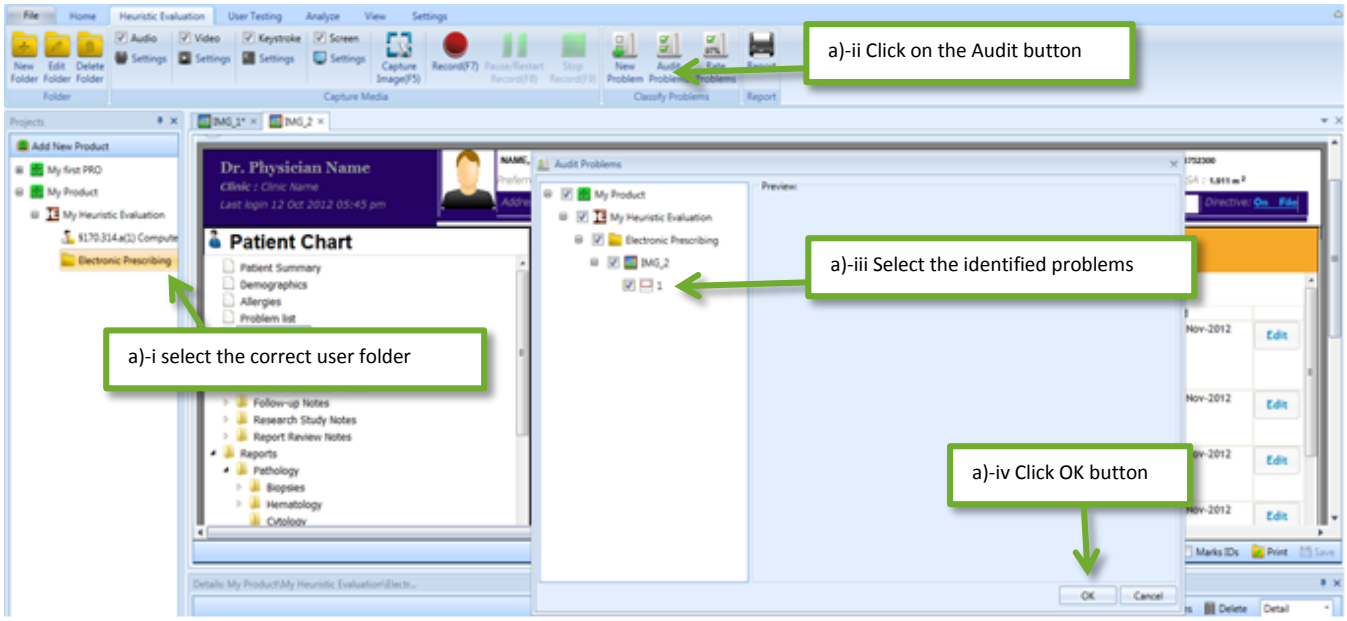
ii. Click on Audit Problem button

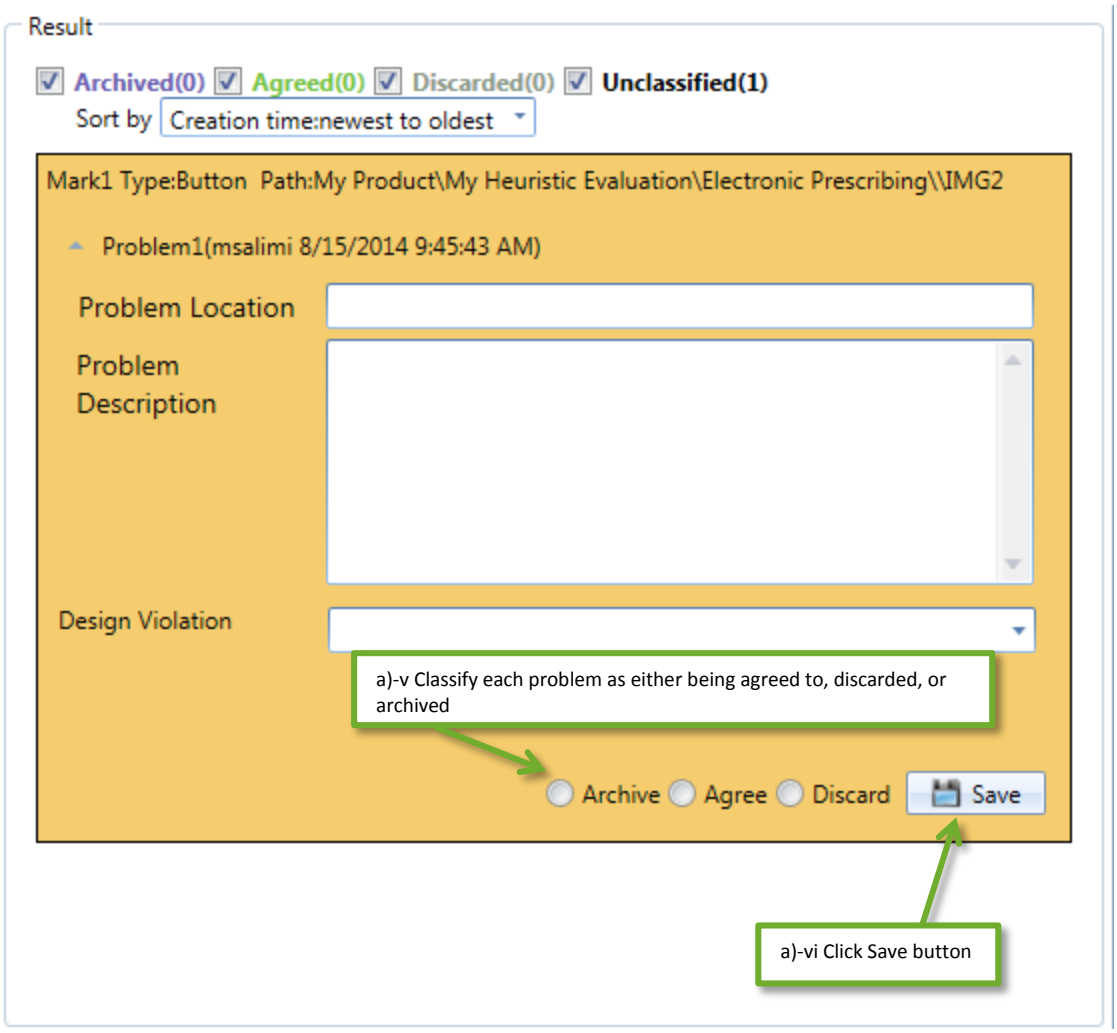
iii. Select the identified problems you want to perform the Audit function on

iv. Click OK button

v. Classify each problem as either being agreed to, discarded, or archived

vi. Click on the Save button





6.3.3 Rate Problem

This button provides a place to rate the problems that have been agreed upon. A user must first choose a location with agreed upon problems in the Project Tree. A display similar to the one found in the Audit Problem section will appear with the reference image on the left and list of approved problems on the right. Rating options include 1 (minor), 2 (moderate), 3 (major), and 4 (catastrophic). Review the agreed upon problem and choose the most appropriate rating. Please be sure to save once you've chosen an option.

a) Rate Problem

i. Select the correct user folder

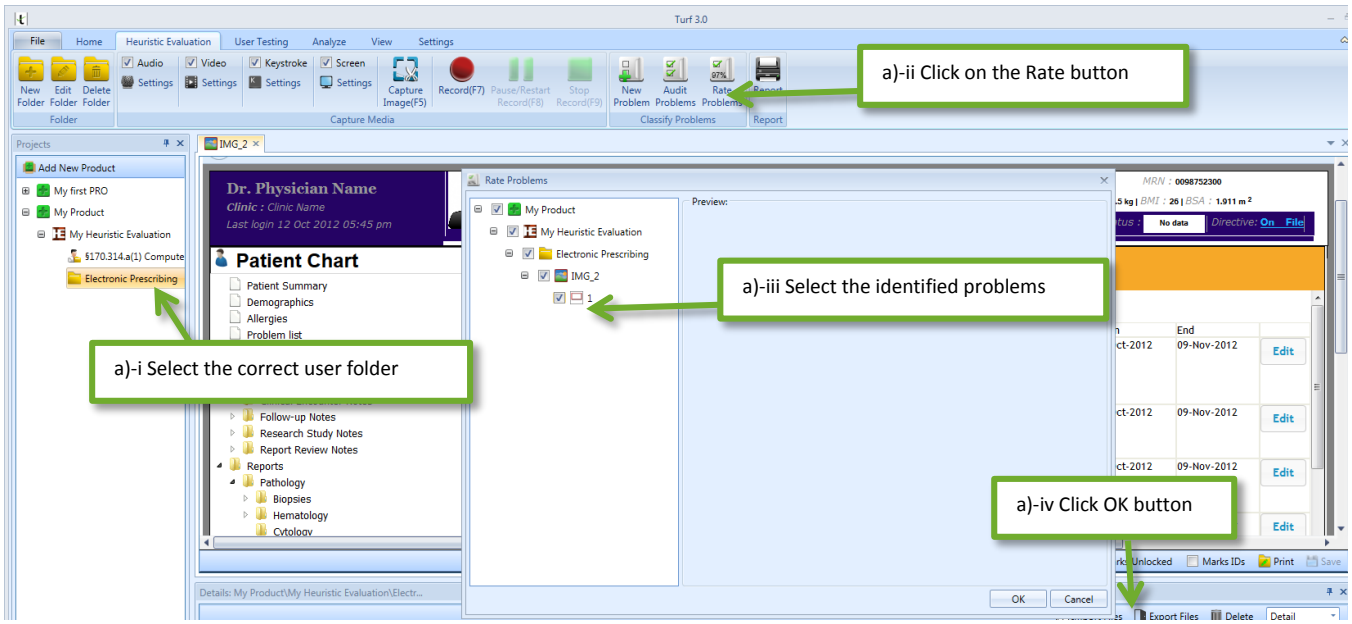
ii. Click on Rate Problem button

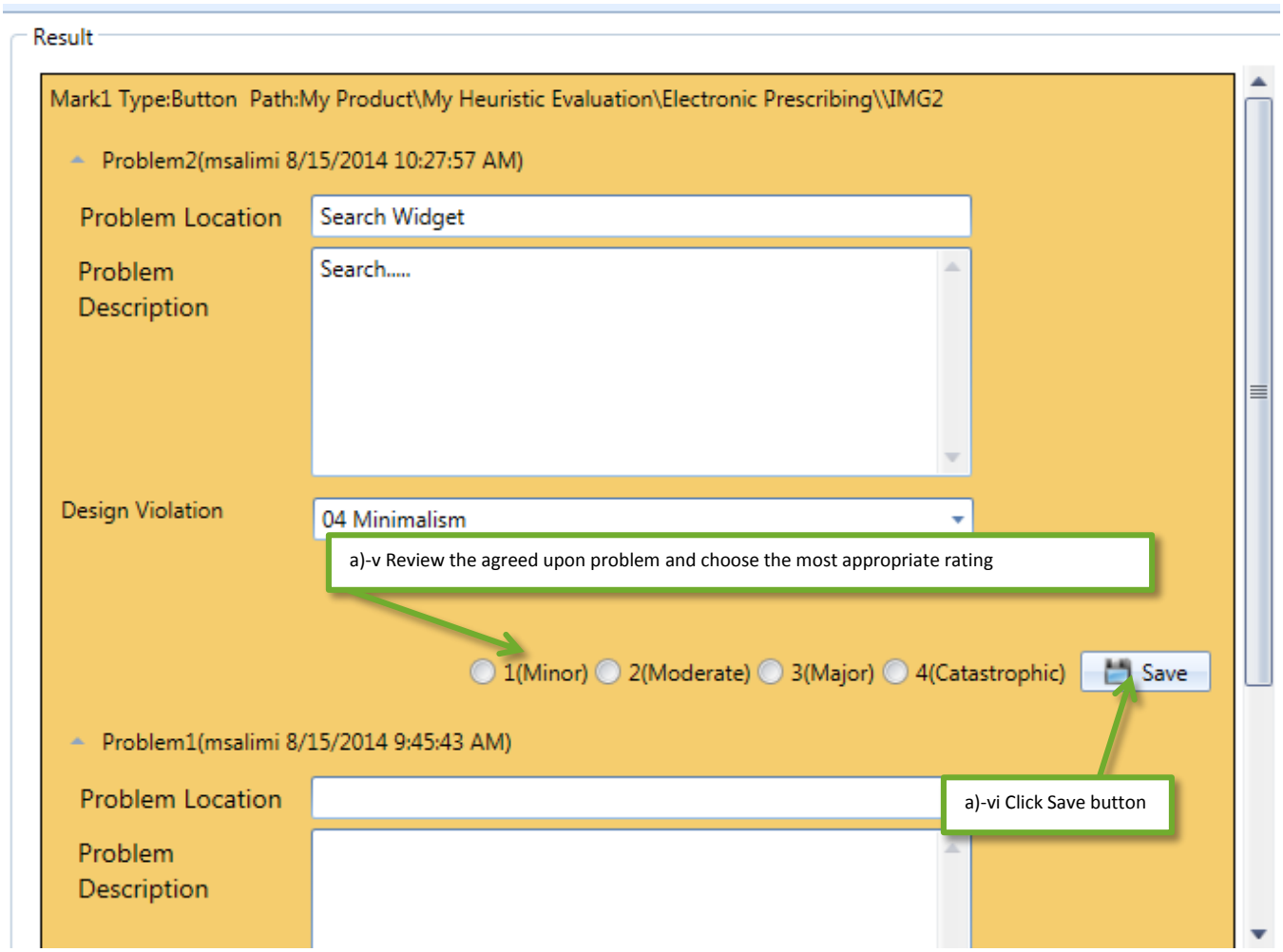
iii. Select the identified problems you want to perform the Rate function on

iv. Click OK button

v. Classify each problem as either being agreed to, discarded, or archived

vi. Click on the Save button





6.4 How to print a report

This button allows a user to print a report of the captured problem descriptions, images, and the severity ratings of each problem. Clicking on the Report button will open up a window where the user can choose different options based on his preferences. For example, if you are only interested in generating a report that shows images with identified marks, you will need to check the ckeckbox for the"Print Image", and select "Images with Marks" radio button. Additionally, you will need to uncheck/de-select the other checkboxes and radio buttons. So, based on your preferences, click on the appropriate check boxes and press the Print button at the bottom of the window for your paper report.

a) Generate Heuristic Evaluation Report

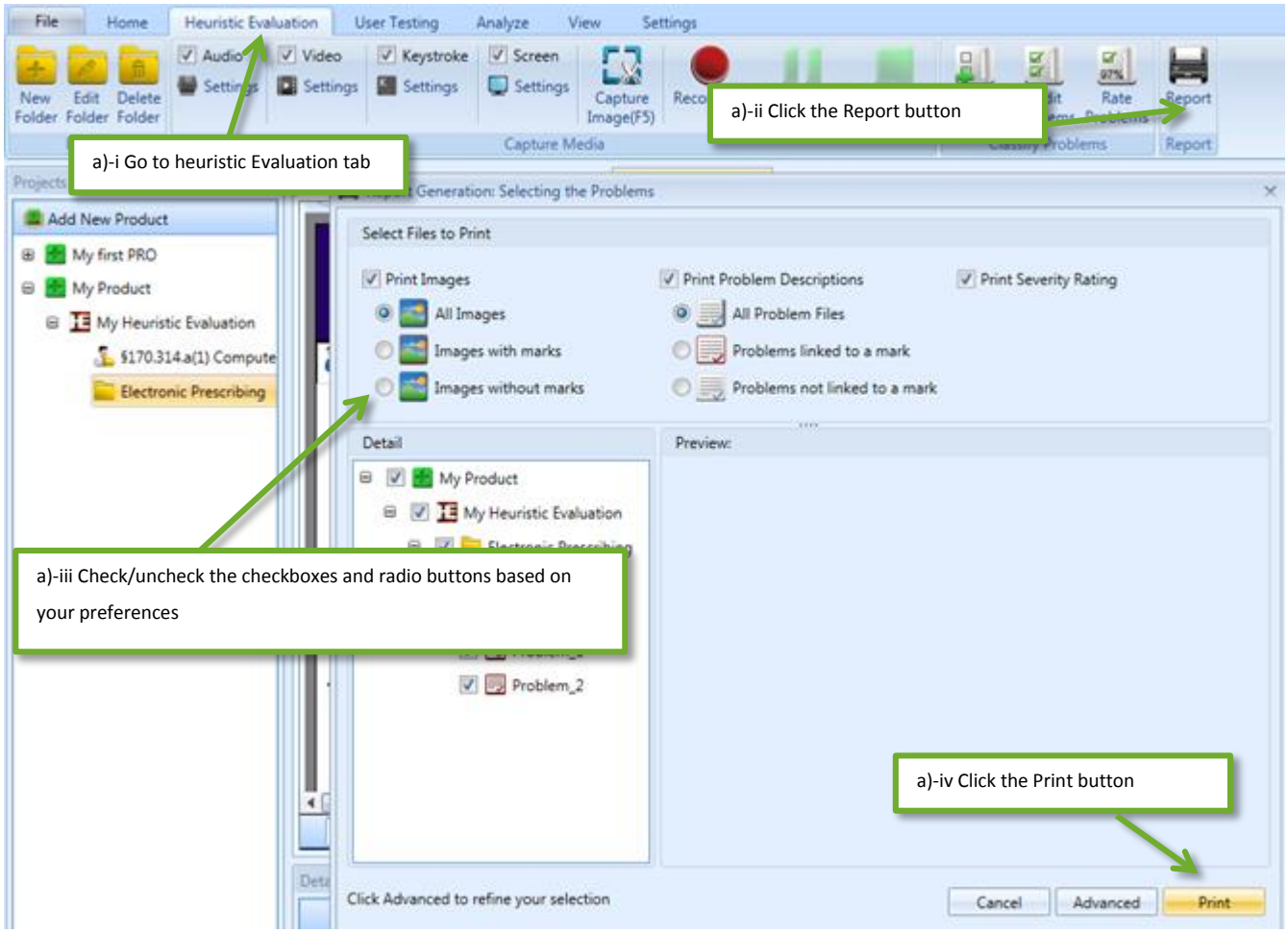
i. Go to heuristic Evaluation tab

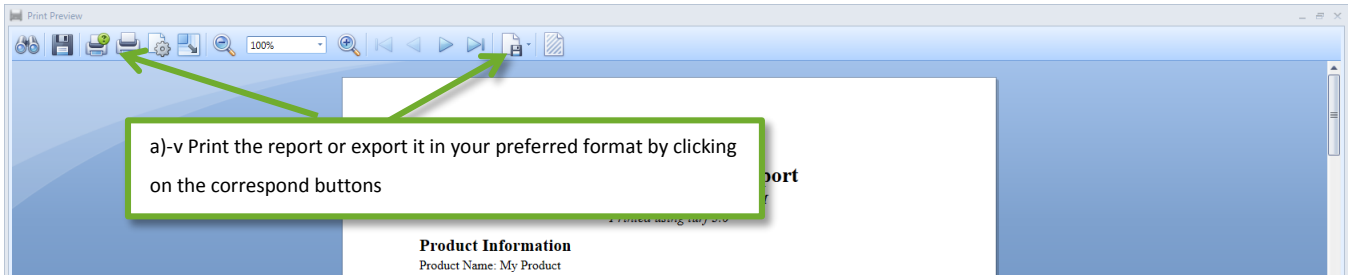
ii. Click the Report button

iii. Check/uncheck the checkboxes and radio buttons based on your preferences

iv. Click the print button at the bottom of the page

v. Print the report or export it in your preferred format by clicking on the correspond buttons


File
Home
Heuristic Evaluation
User Testing
Analyze
View
Settings
Capture Image(F5)
Report
a)-i Go to heuristic Evaluation tab
a)-ii Click the Report button
Add New Product
My first PRO
My Product
My Heuristic Evaluation
Electronic Prescribing
Select Files to Print
Print Images
All Images
Images with marks
Images without marks
Print Problem Descriptions
All Problem Files
Problems linked to a mark
Problems not linked to a mark
Print Severity Rating
Detail
Preview:
Problem_2
a)-iii Check/uncheck the checkboxes and radio buttons based on your preferences
a)-iv Click the Print button
Click Advanced to refine your selection
Cancel
Advanced
Print


a)-v Print the report or export it in your preferred format by clicking on the correspond buttons
Product Information
Product Name: My Product

7. Installing Turf for Android-Capture events using Turf Android

7.1 Installing Turf for Android

The **Install Turf for Android** button allows you to install Turf on your android smartphone or tablet device. Once you have Turf installed on your device, you can start capturing the screen and events of your android device. To learn more about using Turf in an android device, please click here.

7.1.1 How to setup your device

The number of steps or the suggested configuration may vary depending on the devices. The following are suggested steps for any devices with Android 5 or greater. Here, we will present the instructions for Nexus 9 tablet.

Step 1: Check your android version

Setting >> System >> About tablet >> Android Version

The version of your Android device OS must be at least 5.0. If the OS version is less than 5, please upgrade it to Android 5.0 or later.

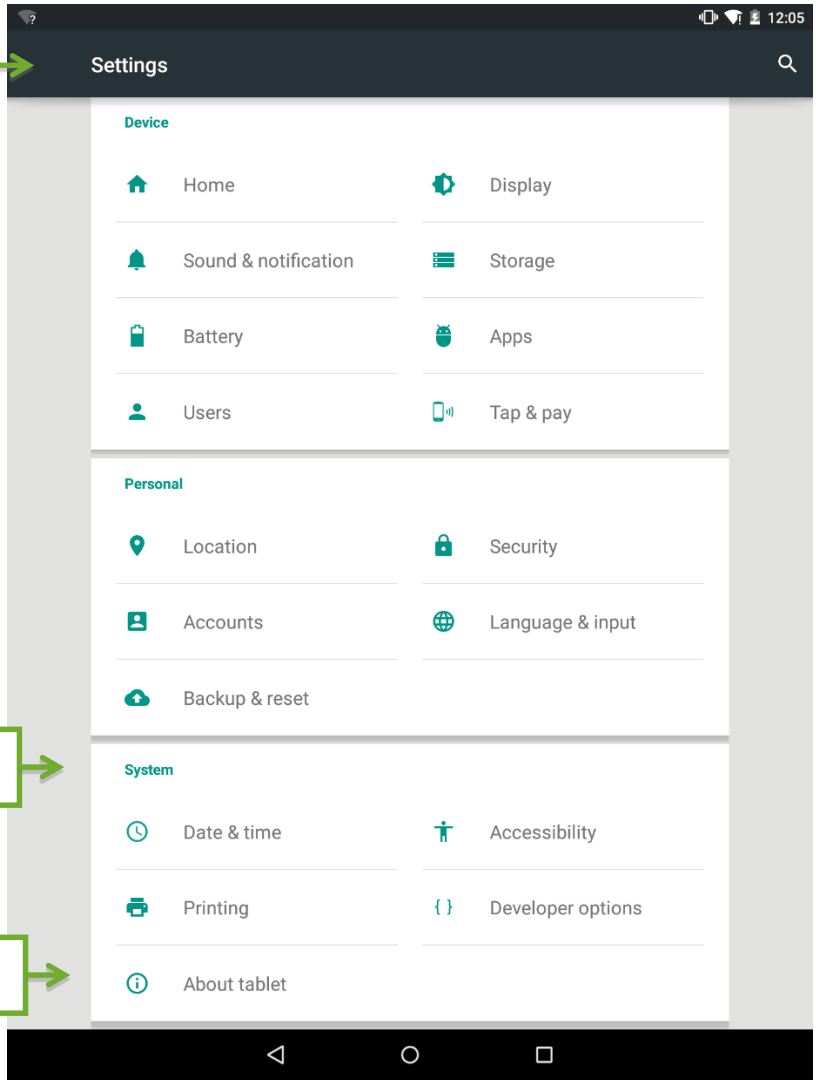
Step 2: Enable Developers mode

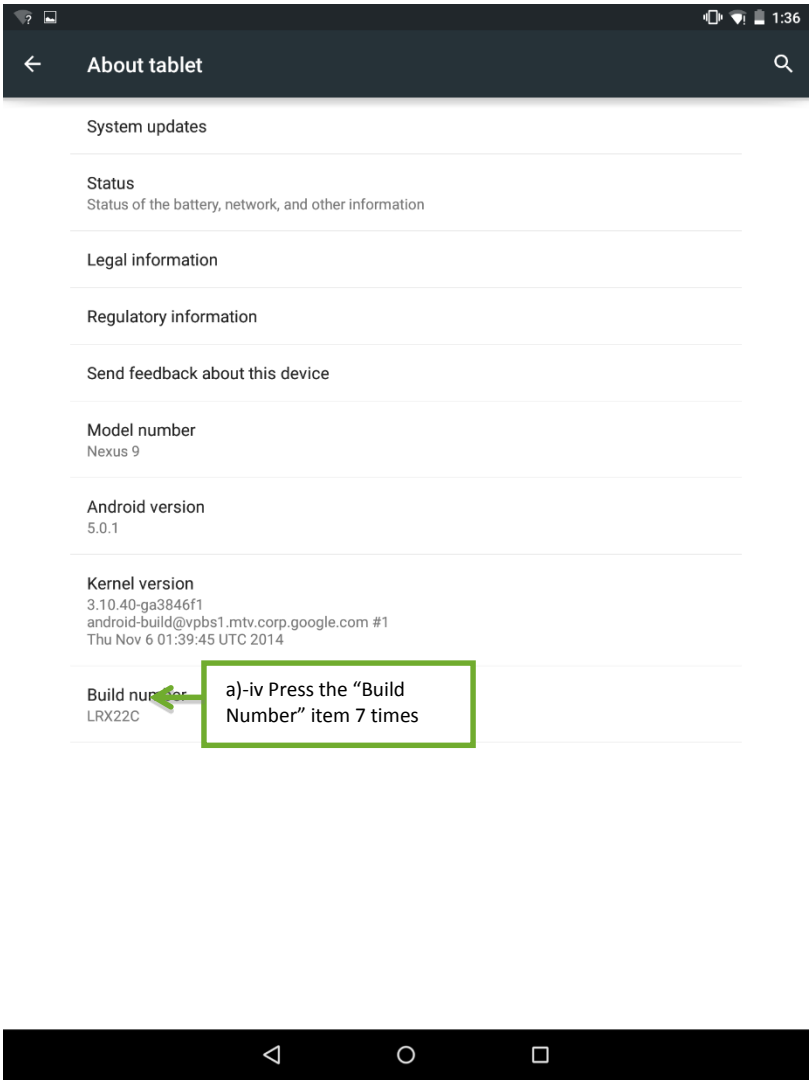
i. Go to Settings
ii. Slide down to the “System” panel
iii. Click on “About tablet”`
iv. Press the “Build Number” item seven times

a)-i Go to settings

a)-ii Slide down to the "System" panel

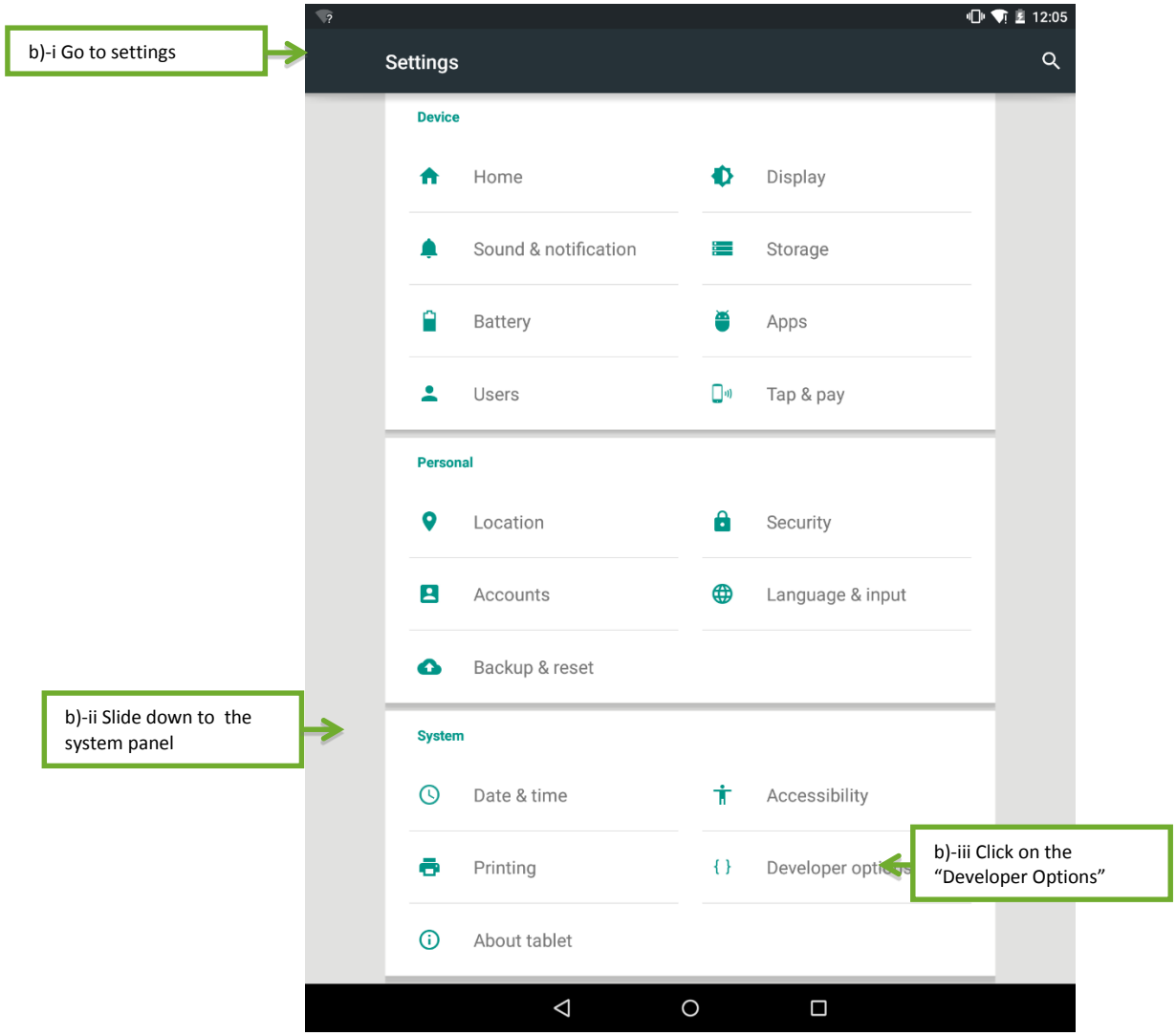
a)-iii Click on "About tablet"

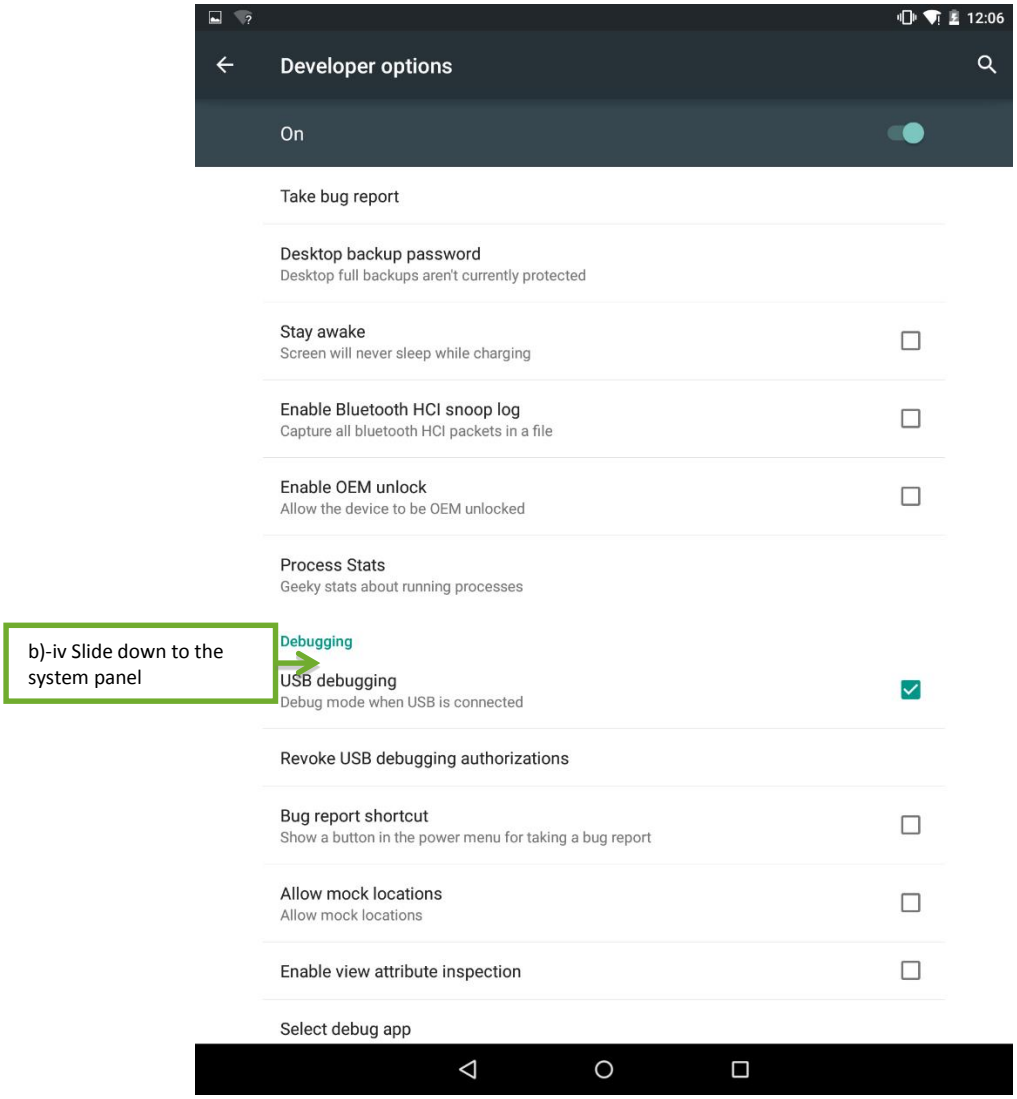




Step 3: Configure Developer settings

i. Go to Settings
ii. Slide down to the "System" panel
iii. Click on "Developer options"
iv. Check the checkbox to select "USB debugging"


b)-i Go to settings
12:05
Settings
Device
Home
Display
Sound & notification
Storage
Battery
Apps
Users
Tap & pay
Personal
Location
Security
Accounts
Language & input
Backup & reset
b)-ii Slide down to the system panel
System
Date & time
Accessibility
Printing
Developer options
About tablet
b)-iii Click on the "Developer Options"



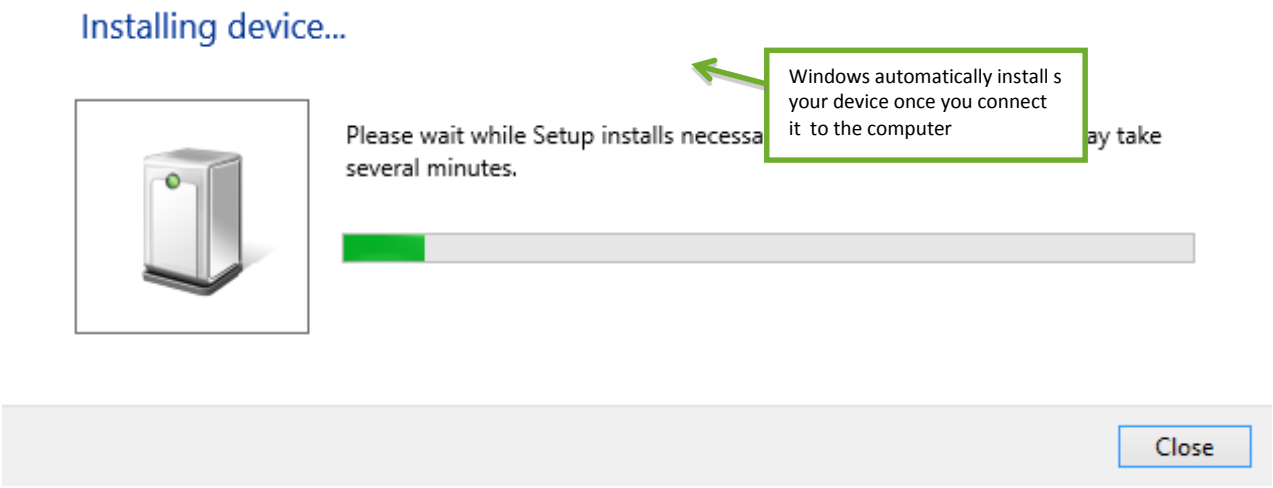
Step 4: Enable side loading apps

Open Settings >> Personal >> Security >> Device Administration

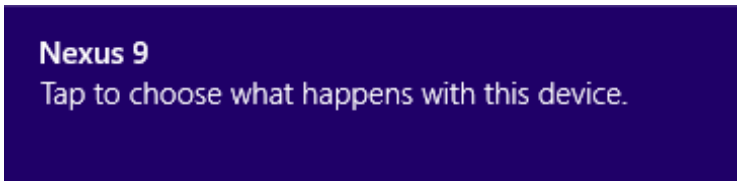
a) Set Unknown Sources to ON

7.1.2 Device Driver Setup

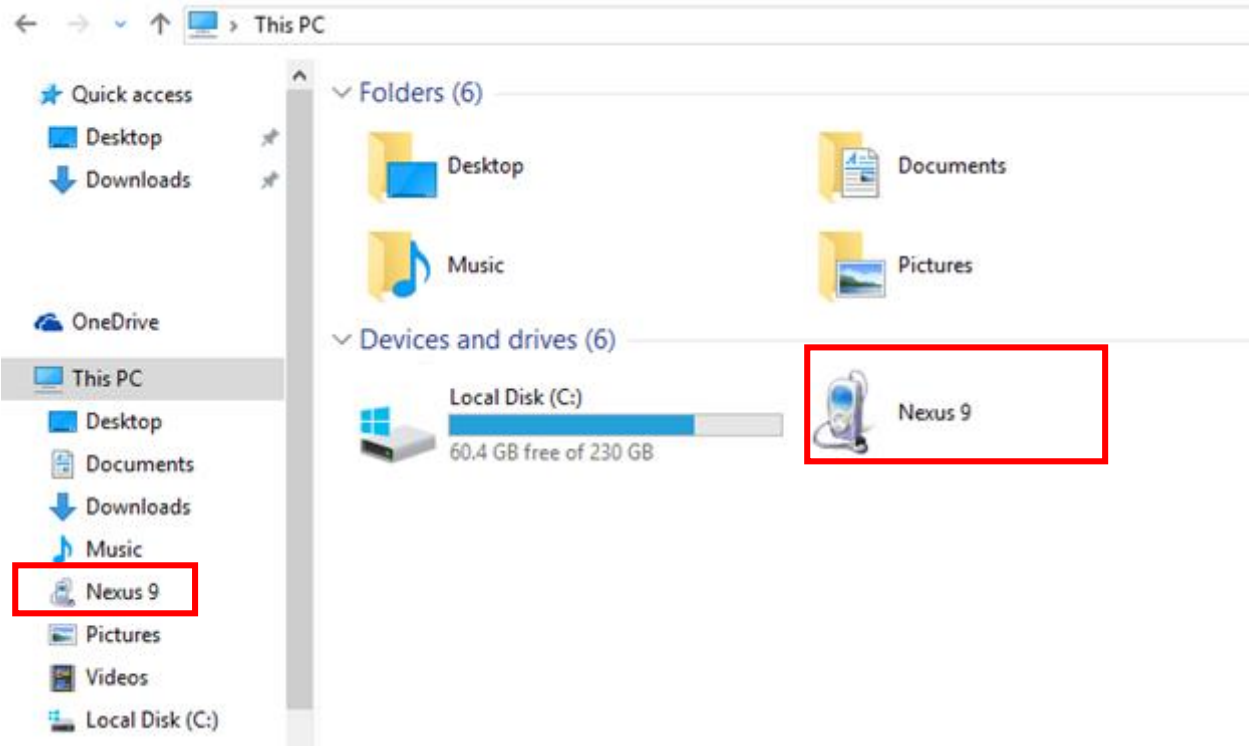
Connect your device to the computer using USB. If you are connecting the device for the first time, windows should automatically detect and install it and you will see a “Installing device….” window. This will appear only the first time you connect your device to your computer.



After successfully installing the device, you will see a notification, such as the one below.



Go to “My Places / This PC / My Computer", and check if you can see your device name.

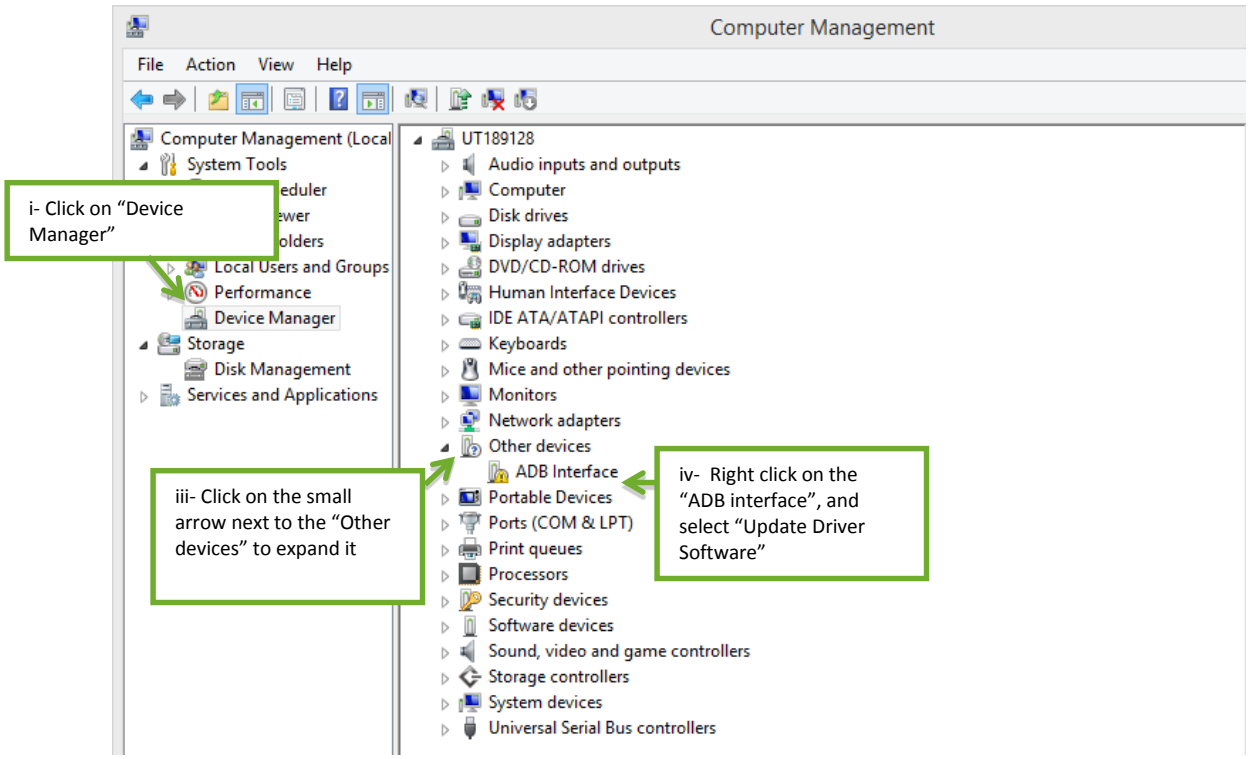


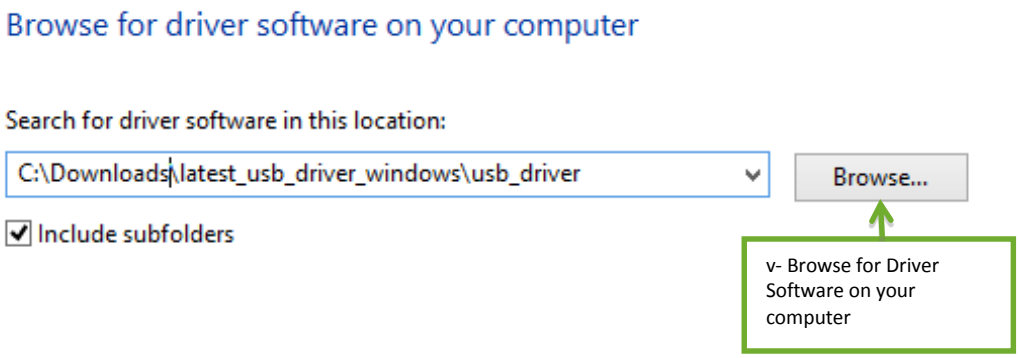
If Windows does not recognize your device, you won't see your device name. Contact your device vendor to obtain appropriate drivers.
Now, you can launch Turf and start installing the Turf for Android. For instructions, please click here.

Note: If Turf does not detect your device, you need to check if you have

1) Activated USB debugging and permitted the installation of 3rd party applications on your device.
2) Installed the appropriate device drivers for ADB interface. Please follow the following steps to install drivers for ADB interface (Only for Google Nexus Devices. For others, refer to vendor sites) :

   i. Go to"Device Manager"
   ii. Click on the small arrow next to "Android Device" to expand it.
   iii. If "Android Composite ADB interface" is present, drivers are correctly installed.
      a. If you do not see this, your device may appear as "Other device". Click on the small arrow next to the "Other devices" to expand it.
   iv. Right click on the "ADB interface", and select "Update Driver Software". Before doing this, make sure you have already downloaded the appropriate driver software. For instructions on how to download driver for Google Nexus devices, please click here.
   v. Browse for Driver software on your computer and wait for the device to be installed and enabled
   vi. After installation unplug the device

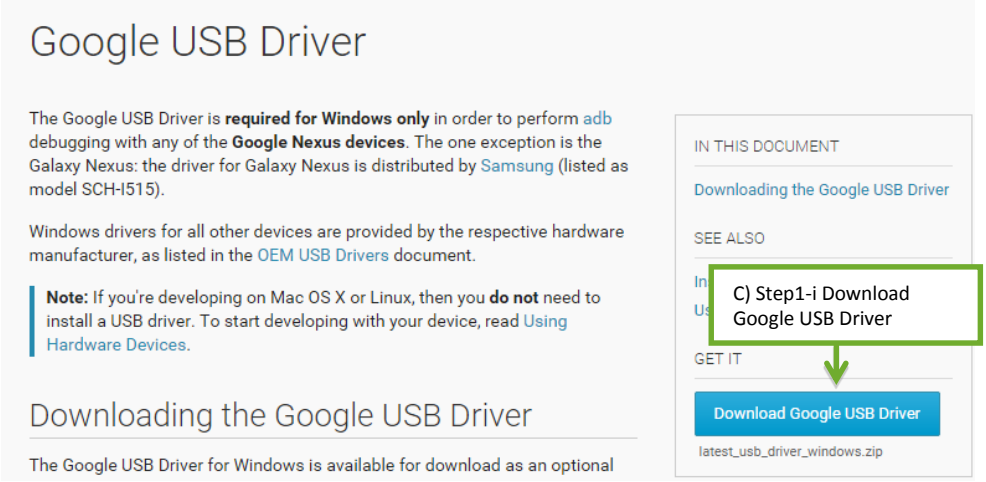




7.1.3 Install USB driver in Windows

Step1: Download

i. Go to the following link to download the Google USB Driver on your desktop computer http://developer.android.com/sdk/win-usb.html.



Step2: Instructions for installing the driver

i. Unzip the downloaded folder by extracting its components
ii. Connect your Android device to your computer using a USB
iii. Right click on the Computer icon and click on the “Manage” item
iv. Click on “Device Manager” from the left panel
v. Click on the small arrow next to the “Other devices” to expand it
vi. Right click on the “ADB interface”, and select “Update Driver Software”
vii. Browse for Driver software on your computer and wait for the device to be installed and enabled
viii. After installation unplug the device

7.1.4 Configuration and Installation

Follow the following steps to utilize the Turf android app. The number of steps or the suggested configuration may vary depending on the devices. The following are suggested steps for any devices with Android 4.4 or greater.

a. Turf Installation on Android Devices

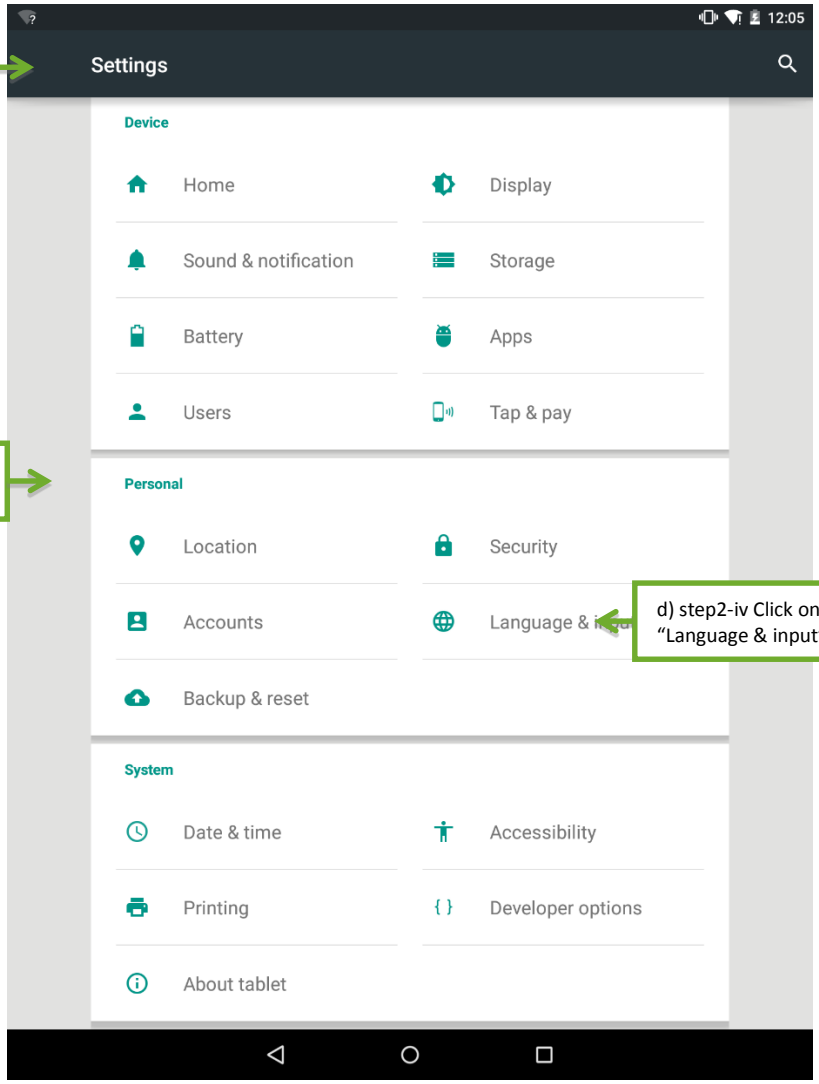
Step1: Install Android in Turf

i. Connect the device to your computer
ii. Open Turf
iii. Go to Settings
iv. Select “Install android”
v. Click on the “Install” button

Step2: Activating Turf Keyboard and Turf Launcher

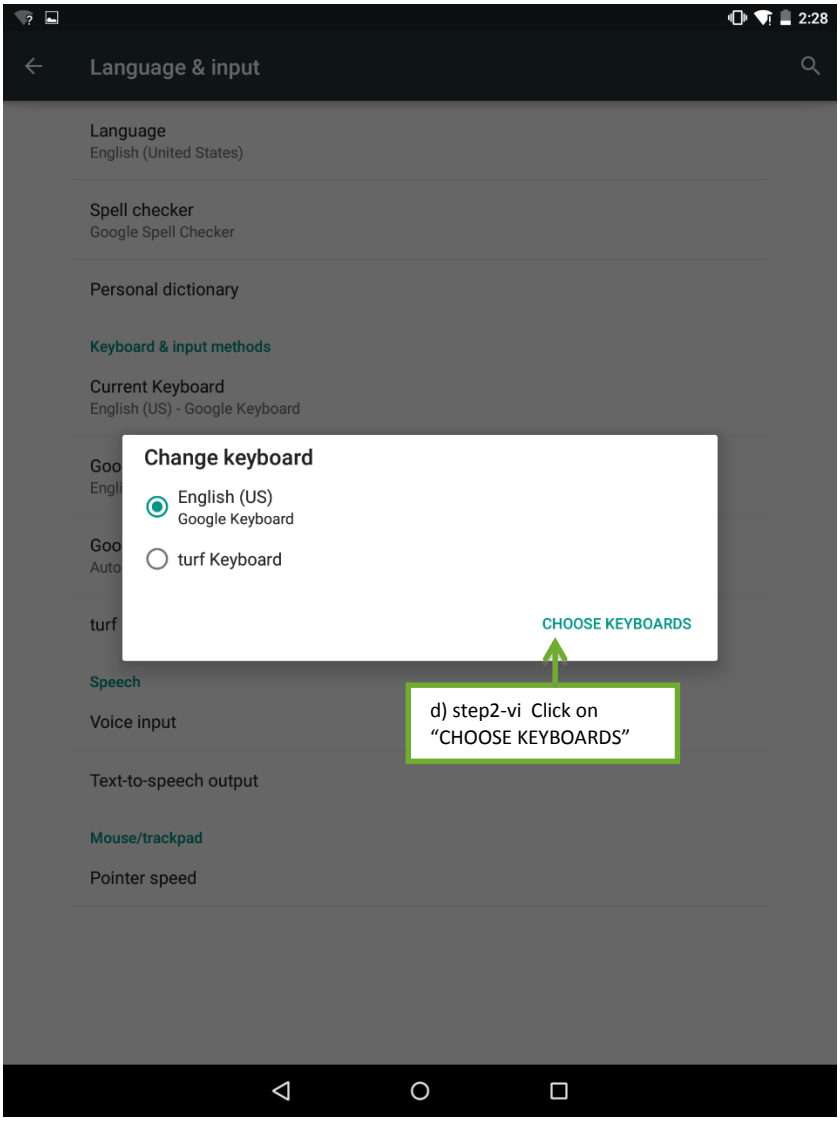
i. Open the Android device
ii. Go to Settings
iii. Go to “Personal” panel
iv. Click on “Language and input”
v. On the “Language & input” screen, click on “Current keyboard”
vi. Click on “CHOOSE KEYBOARDS”
vii. Turn on the “turf Keyboard” item
viii. Click on the OK button on the “Attention” window
ix. Get back to the “language & input” window and click on “Current Keyboard”
x. Click on the “turf Keyboard” radio button to select it
xi. Go back to Settings
xii. Go to the “Device” panel
xiii. Click on the “Home” item
xiv. Click on “Turf launcher” radio button to select it

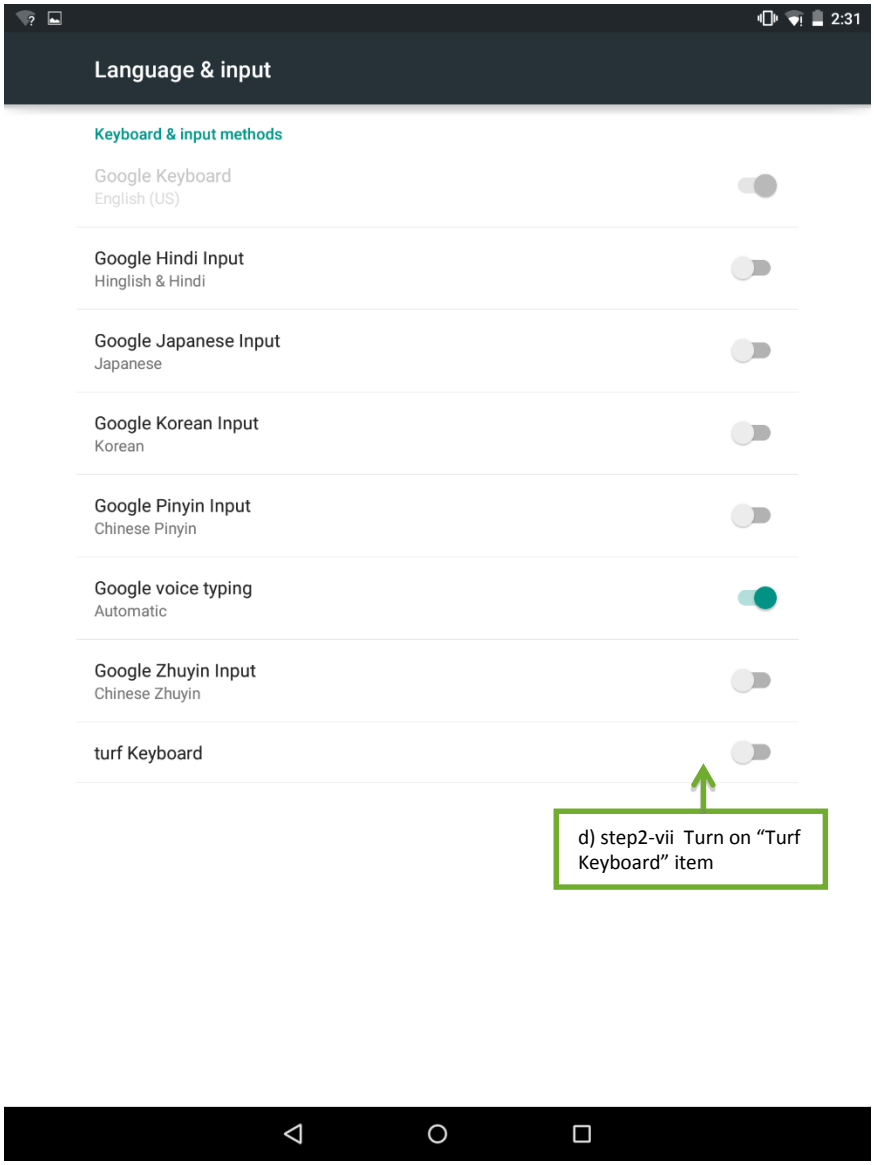
d) step2-ii Go to settings

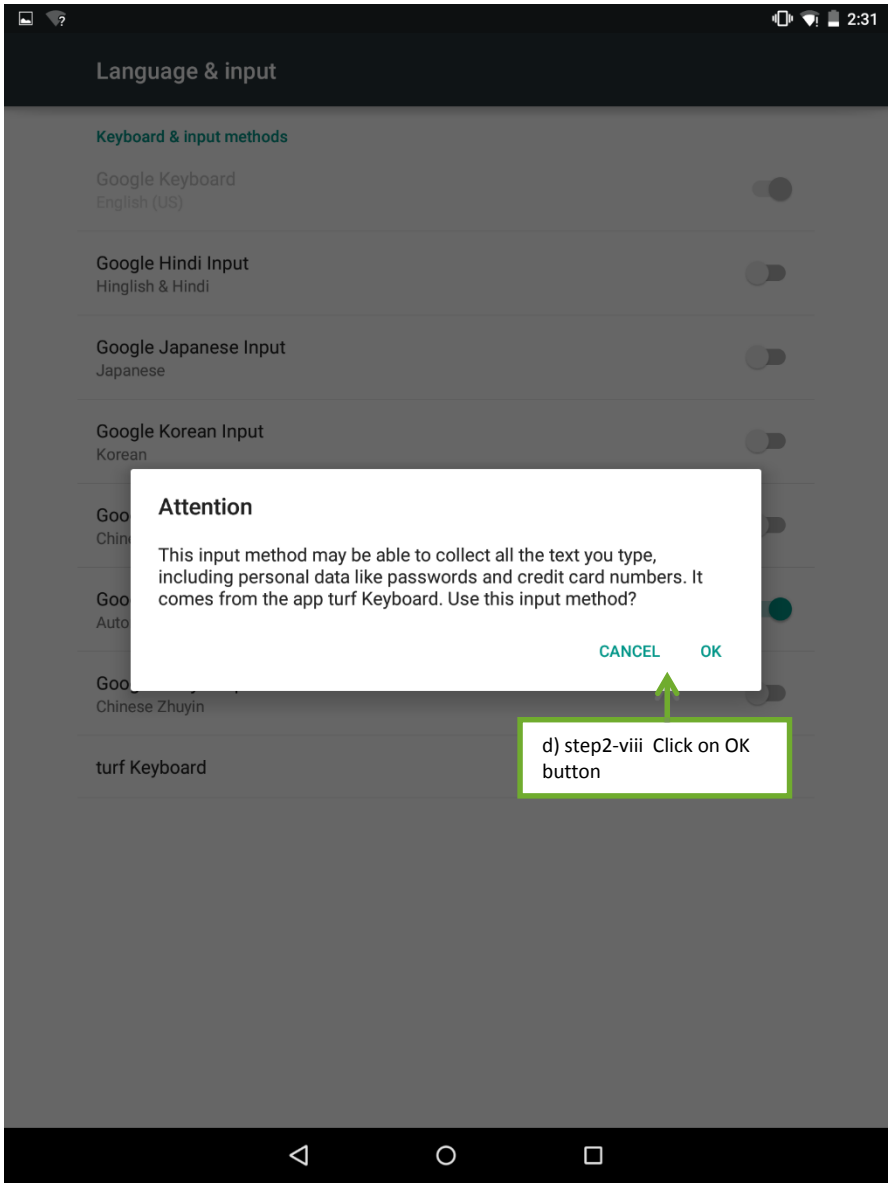


d) step2-iii Go to "Personal' panel

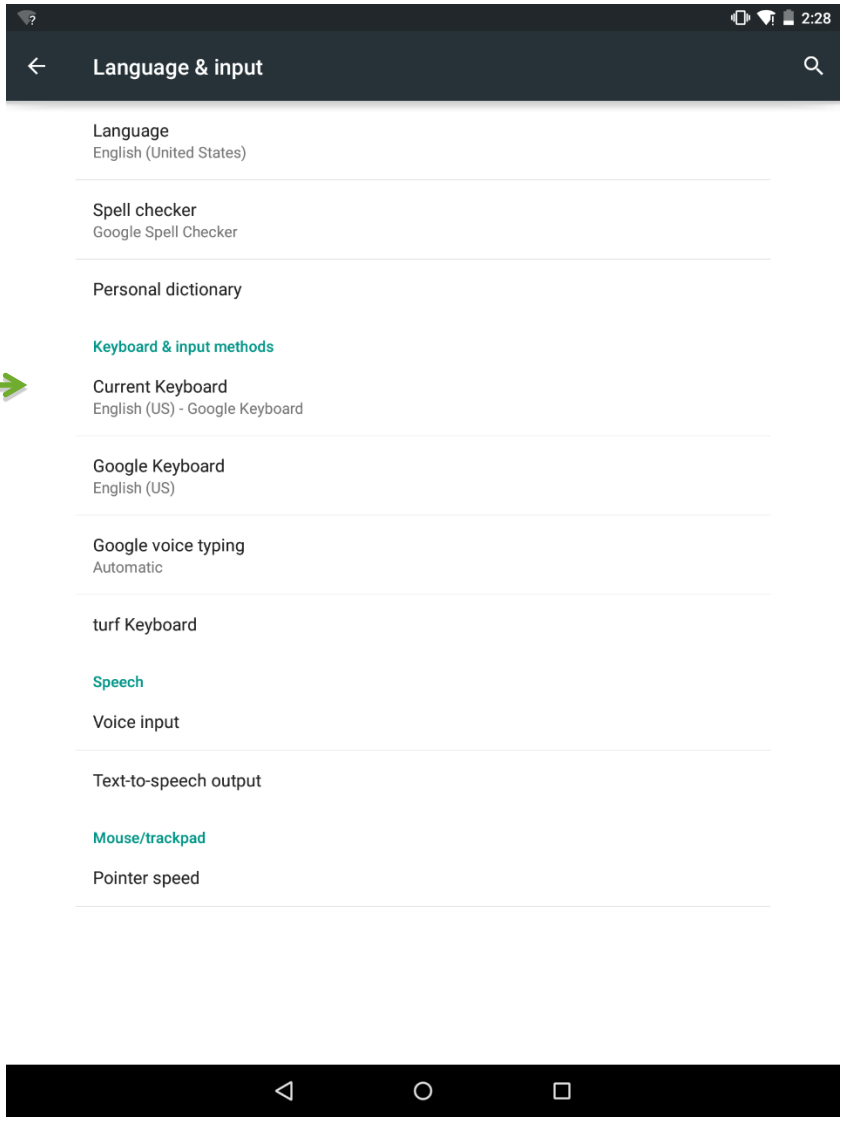
d) step2-iv Click on "Language & input"

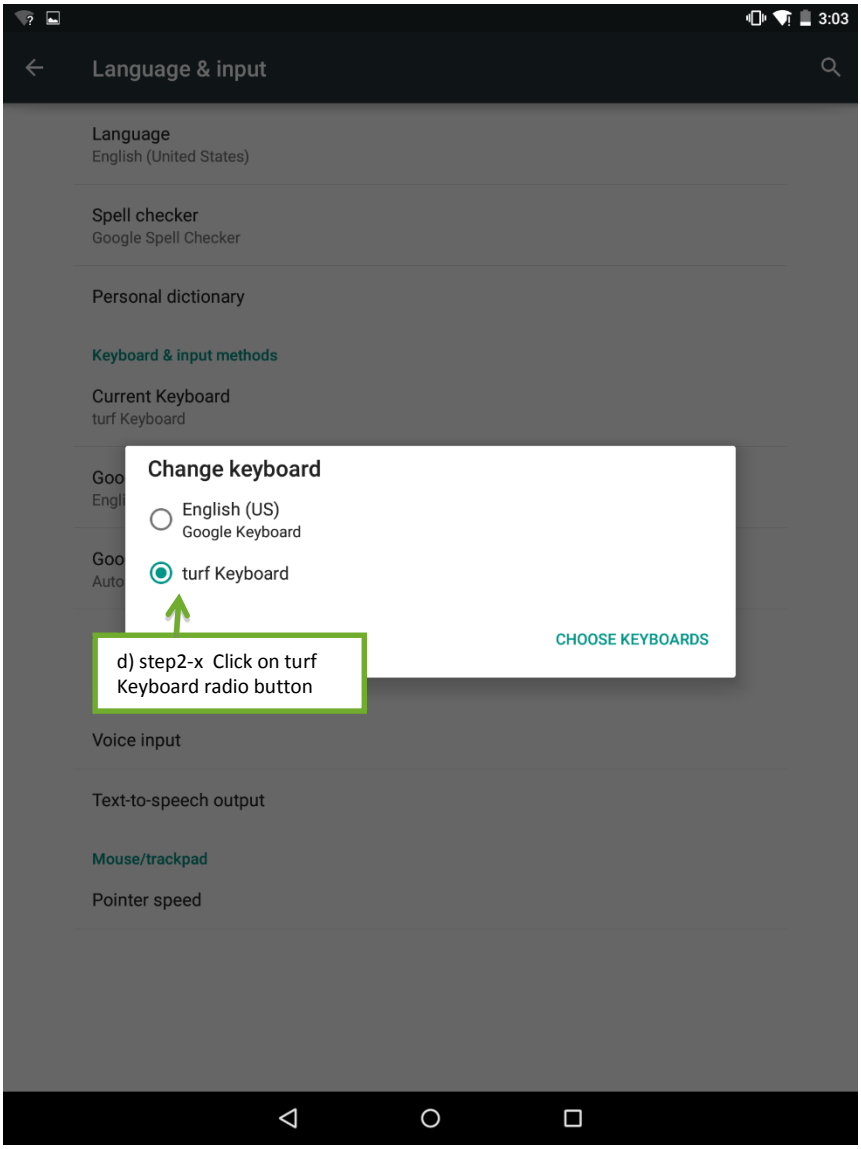

2:28
Language & input
Language
English (United States)
Spell checker
Google Spell Checker
Personal dictionary
Keyboard & input methods
Current Keyboard
English (US) - Google Keyboard
Change keyboard
English (US)
Google Keyboard
turf Keyboard
CHOOSE KEYBOARDS
Speech
Voice input
Text-to-speech output
Mouse/trackpad
Pointer speed
d) step2-vi Click on
“CHOOSE KEYBOARDS”

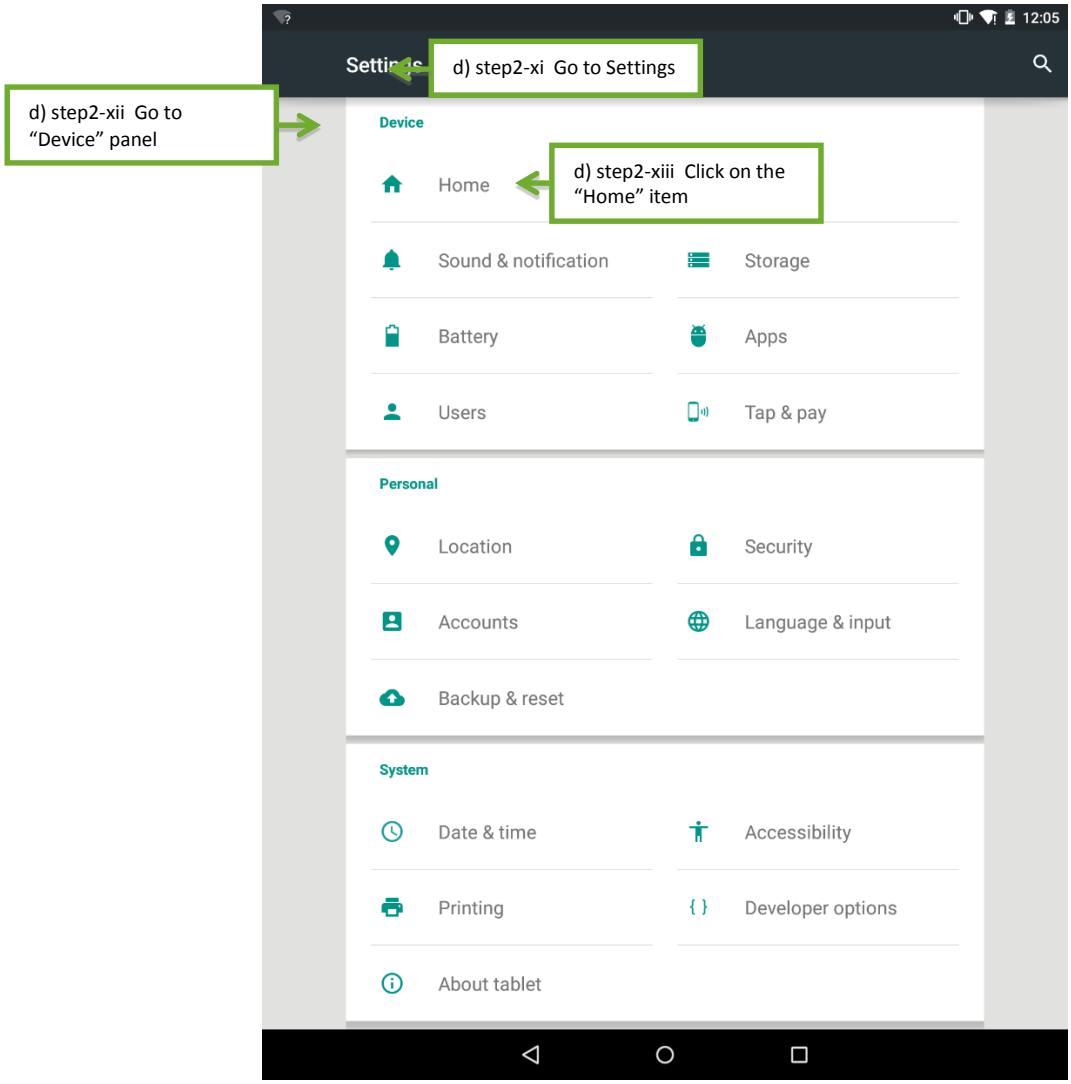

2:31
Language & input
Keyboard & input methods
Google Keyboard
English (US)
Google Hindi Input
Hinglish & Hindi
Google Japanese Input
Japanese
Google Korean Input
Korean
Google Pinyin Input
Chinese Pinyin
Google voice typing
Automatic
Google Zhuyin Input
Chinese Zhuyin
turf Keyboard
d) step2-vii Turn on “Turf Keyboard” item

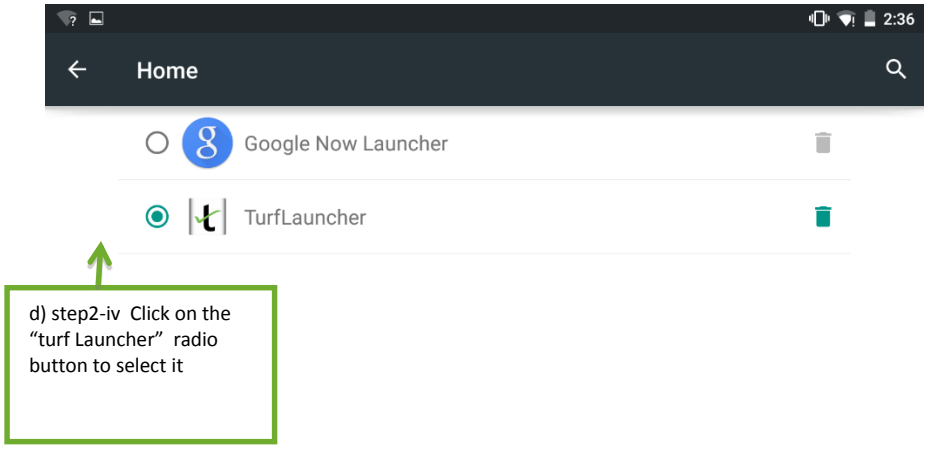

2:31
Language & input
Keyboard & input methods
Google Keyboard
English (US)
Google Hindi Input
Hinglish & Hindi
Google Japanese Input
Japanese
Google Korean Input
Korean
Attention
This input method may be able to collect all the text you type, including personal data like passwords and credit card numbers. It comes from the app turf Keyboard. Use this input method?
CANCEL
OK
Chinese Zhuyin
turf Keyboard
d) step2-viii Click on OK button

d) step2-ix Click on "Current Keyboard"




3:03
Language & input
Language
English (United States)
Spell checker
Google Spell Checker
Personal dictionary
Keyboard & input methods
Current Keyboard
turf Keyboard
Change keyboard
English (US)
Google Keyboard
turf Keyboard
CHOOSE KEYBOARDS
d) step2-x Click on turf Keyboard radio button
Voice input
Text-to-speech output
Mouse/trackpad
Pointer speed


d) step2-xii Go to "Device" panel
d) step2-xi Go to Settings
d) step2-xiii Click on the "Home" item
12:05
Device
Home
Sound & notification
Storage
Battery
Apps
Users
Tap & pay
Personal
Location
Security
Accounts
Language & input
Backup & reset
System
Date & time
Accessibility
Printing
Developer options
About tablet



After successfully installing Turf on your Android device, you will be able to use Turf Android features.

Note: After you finish working with Turf, make sure to turn off the Turf keyboard and launcher in your android device. This is to ensure that your device activities are not being logged.

7.2 Capture events using Turf Android

a) **Follow the following steps to use Turf Android features**

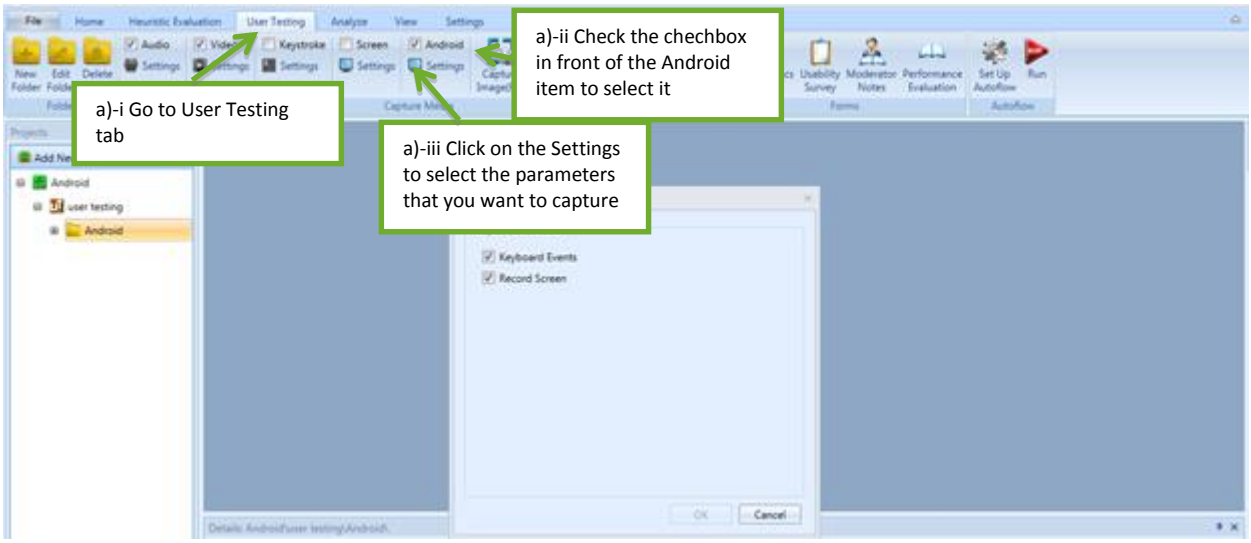
i. Go to **User Testing** tab, select the folder where you want to store your data

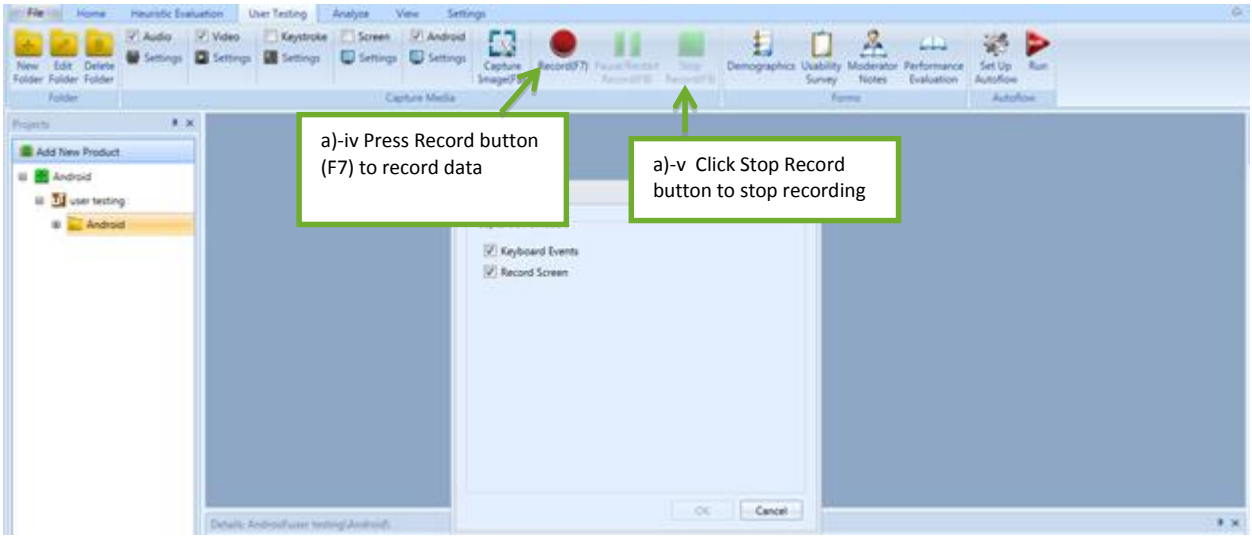
ii. Check the checkbox for **Android** in the Capture Media ribbon, under the User Testing tab at the top of the screen, to select it

iii. Click on Android Settings to select the parameters that you would like to capture

iv. Press **Record (F7)** button to record data

v. Once you are done with recording, click Stop Record (F9) button to stop the recording.





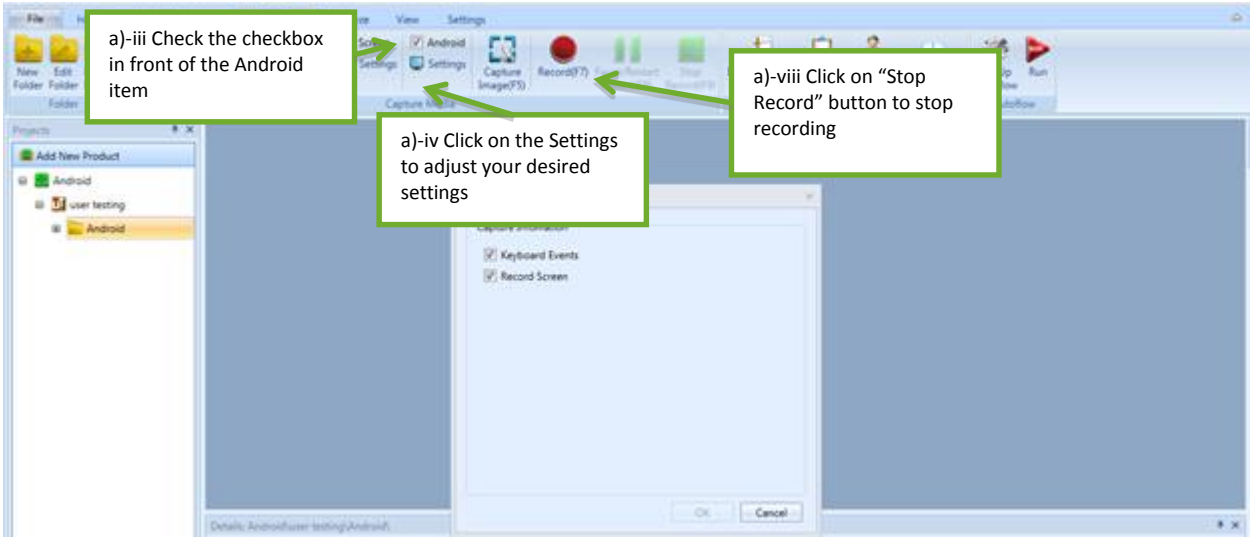
8. Using Turf Android App- Example

8.1 Using Turf Android app: Conduct a User Testing Project and analyze it

a) Perform a User testing project

i. Open Turf on your computer
ii. Create a User Testing Project in Turf- For instructions on how to create a user Testing file, click on the following link (https://sbmi.uth.edu/nccd/turf/training-media/)
iii. On the "User Testing" tab, check the checkbox in front of the "Android" item
iv. Click on the Settings to adjust the desired settings
    a. Checking the keyboard events checkbox will allow for recording keyboard activity (only if you have already set Turf Keyboard as the active input on your android device, please refer to settings on how to setup Turf for Android)
    b. Checking the Record screen checkbox will allow for recording all screen activity. The recordings are initially saved in the device and then moved to the computer.
v. Click on the Record button or press F7
vi. Example task in your android device: Launch the Chrome application on your android device
    a. Click in the address bar and type http://drogith.com/dehr
    b. In the search bar, enter Metformin
    c. Pick Metformin 500mg Oral tablet
    d. Click on the "Add to Order" button
    e. On the pop up window (Edit Medications Details), click the "Add" button to add a problem
    f. Select "E11.9 Non-insulin dependent Capture" from the dropdown list
    g. Click the "Add" button
    h. Enter a dose for medication, e.g., 500 mg
    i. Enter 30days for the "duration"
    j. Select oral as the rout from the drop down menu
    k. Enter 30 in the "Dispense" field
    l. Enter 1 for the "Take" field
    m. Select "BID" for the "Frequency" field
    n. Choose "Start" and "End" Date
    o. Enter "Take after meals" for the "Pt instruction field"
    p. Click on the "Save and Close" button
    q. Click on the "Sign Order" button
    r. Click on the "Confirm" button
vii. Now, return to Turf in your computer
viii. Click on "Stop Record" button (F9) to stop recording
ix. Turf will upload the saved files from your android device to computer. This might take a while, do not disconnect your device.

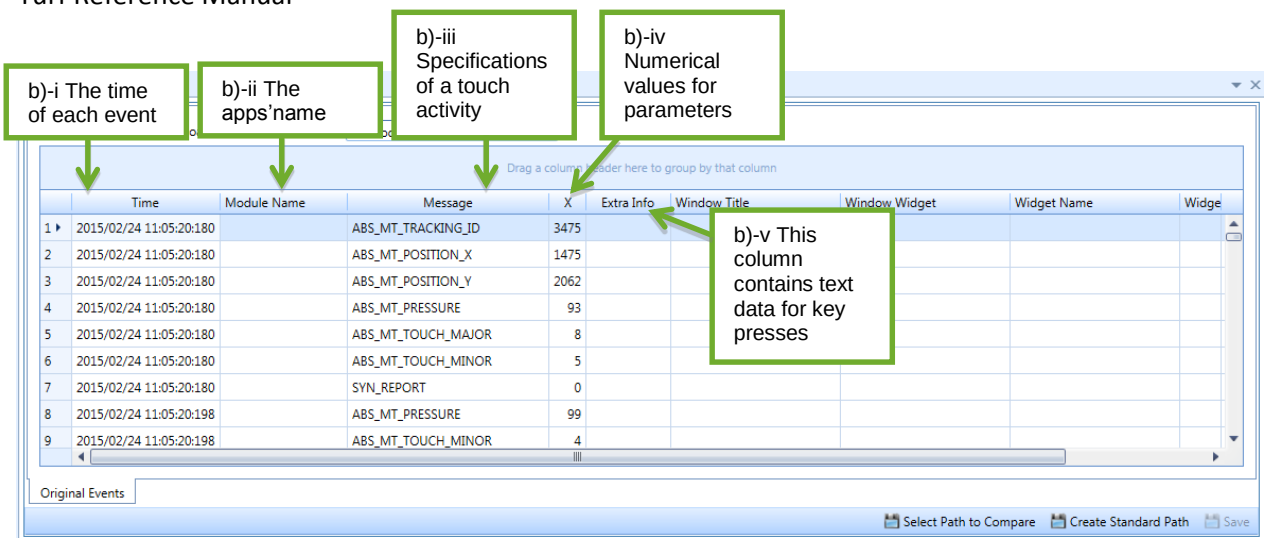
Once completed, the recordings will be available in Turf for analysis



b) Using Turf android app: Analyze the recordings

Double click on the recorded files on the "Details" panel to view their content (Make sure that you have selected the desired folder). Double click on the windows event file to view the recorded key events

i. The first column records the time of each event
ii. The second column records the name of apps that used during the recording. If it is empty, it shows that only the main system was used.
iii. The third column describes the specifications of a touch activity. A touch action is defined by the finger id, width of touching finger, pressure, and the x, y location on the screen. As a result, a single touch might be presented with 2-8 rows in the event file. Subsequently, a single gesture - series of touch - can have as many as 20-40 rows in the event file.
iv. The fourth column provides numerical values for x, y and other parameters
v. The fifth column contains the text data for key presses. As the number of rows that a single touch can have is more than one, the key press data can also have more than one row.



9. User Testing Procedures

9.1 Launch and Set Up a New User Testing Project

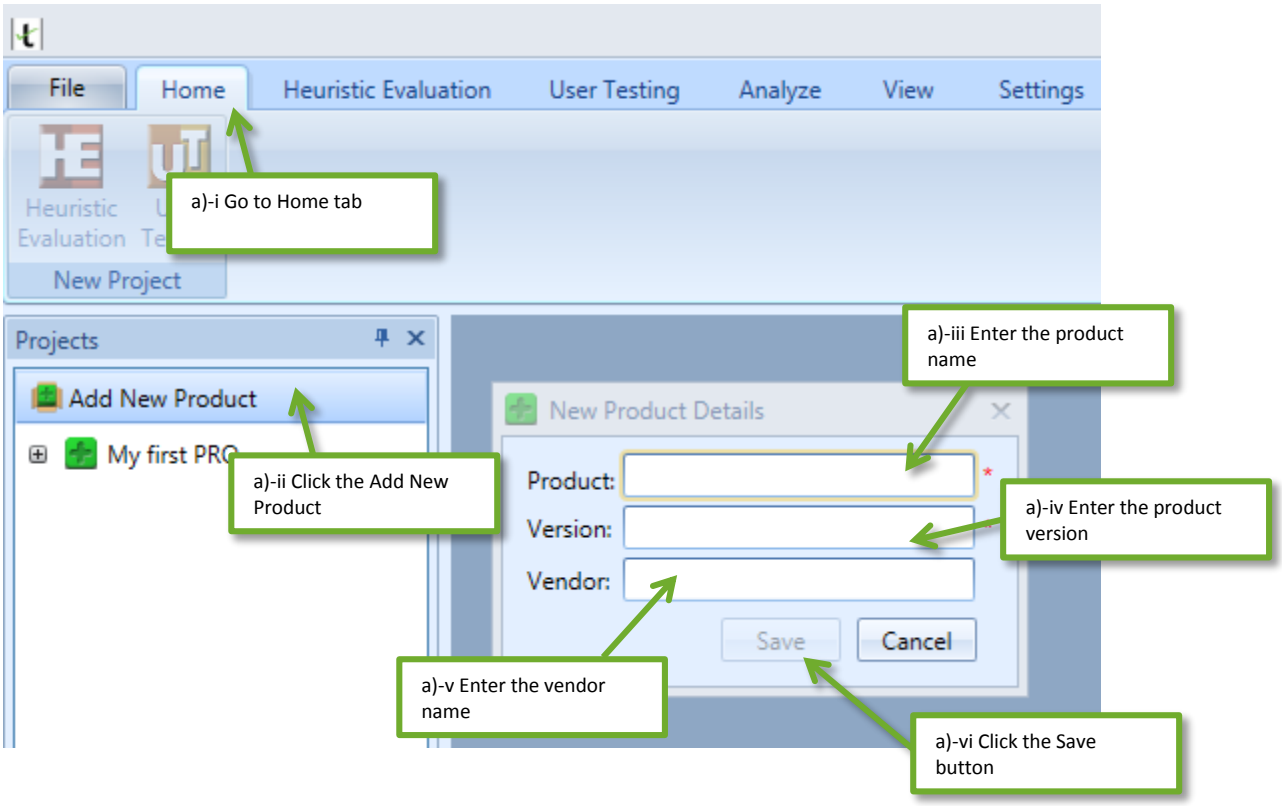
9.1.1 Launch Turf

After loading the software on the computer, a user will launch Turf by double clicking on the Turf desktop icon. Then the user will see the File interface where she can create a new product for the heuristic evaluation.

9.1.2 Create a New Product

a) Create a new product evaluation folder

i. Go to **Home tab**
ii. Click the **Add New Product**
iii. **Enter** the product **name** (e.g., Alpha)
iv. **Enter** the product **version** (e.g., Alpha)
v. **Enter** the vendor **name** (e.g., SharpC)
vi. Click the **Save** button

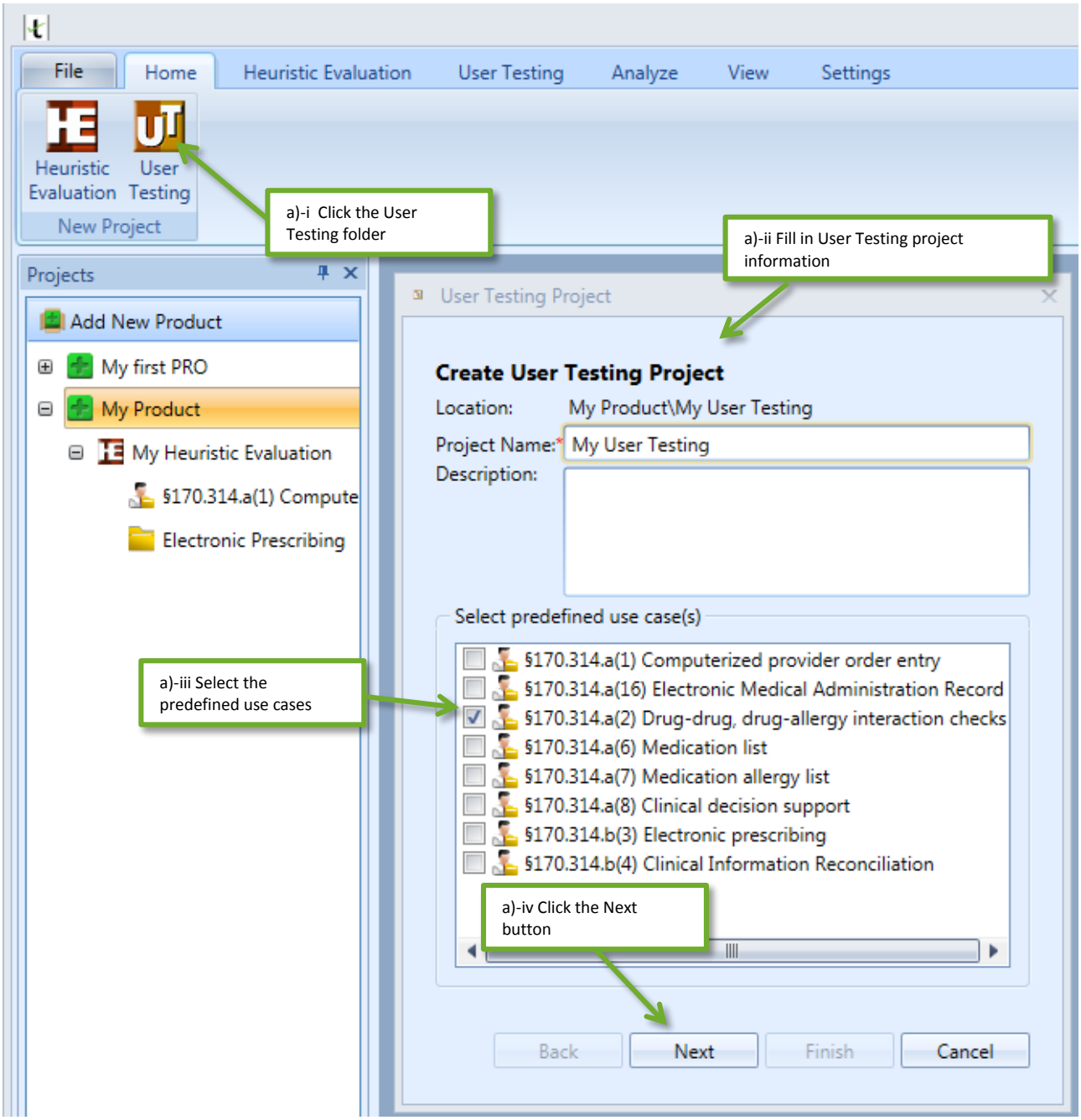


9.1.3 Set up a New User Testing Project Folder

After you set up a new product, choose the type of usability method (e.g., Heuristic Evaluation or User Testing) to conduct. In this case, choose User Testing.

a) Create a User Testing project folder

i. On the projects panel, click on the **User Testing icon**
ii. **Fill in** User Testing project **information** in the pop-out window
iii. **Select** the predefined use cases, e.g., check **Electronic Prescribing** and **Clinical Information Reconciliation**. You cannot add these to a project later, so choose all you think you will use now. We have included the NIST Use Case documents for the eight required functions for Meaningful Use Stage 2. Your administrator may add other reference materials for you.
iv. Click the **Next** button



9.1.4 Associate Data Forms with Your Project

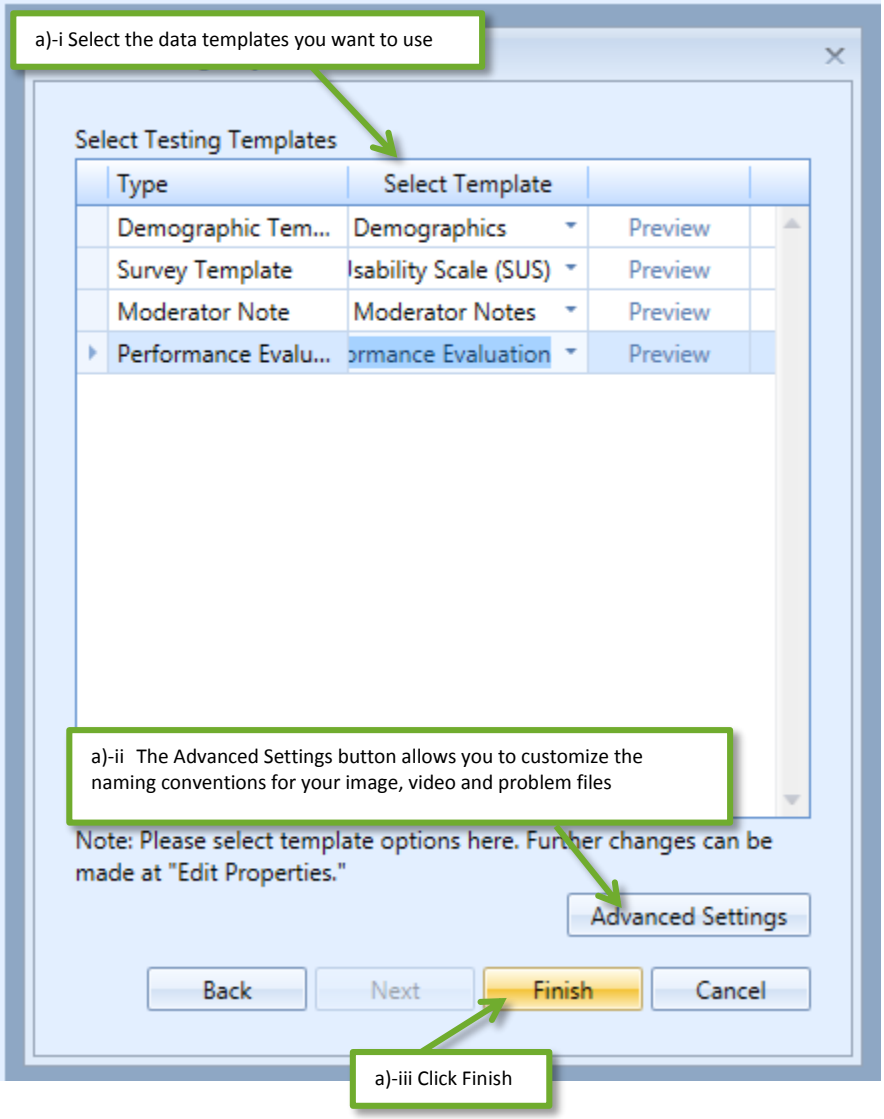
In this step you will associate the correct form with the button from which you will access it. You cannot add these to a project later, so it is best to choose any you think you will use now.

a) Associate data forms with your project

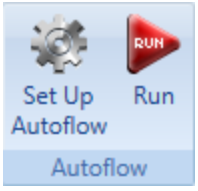
i. Using the drop down menu, **select** the data templates you want to use

ii. The **Advanced Settings** button allows you to customize the naming conventions for your image, video and problem files. For now, we will use the default settings

iii. Click **Finish** button



9.2 Autoflow



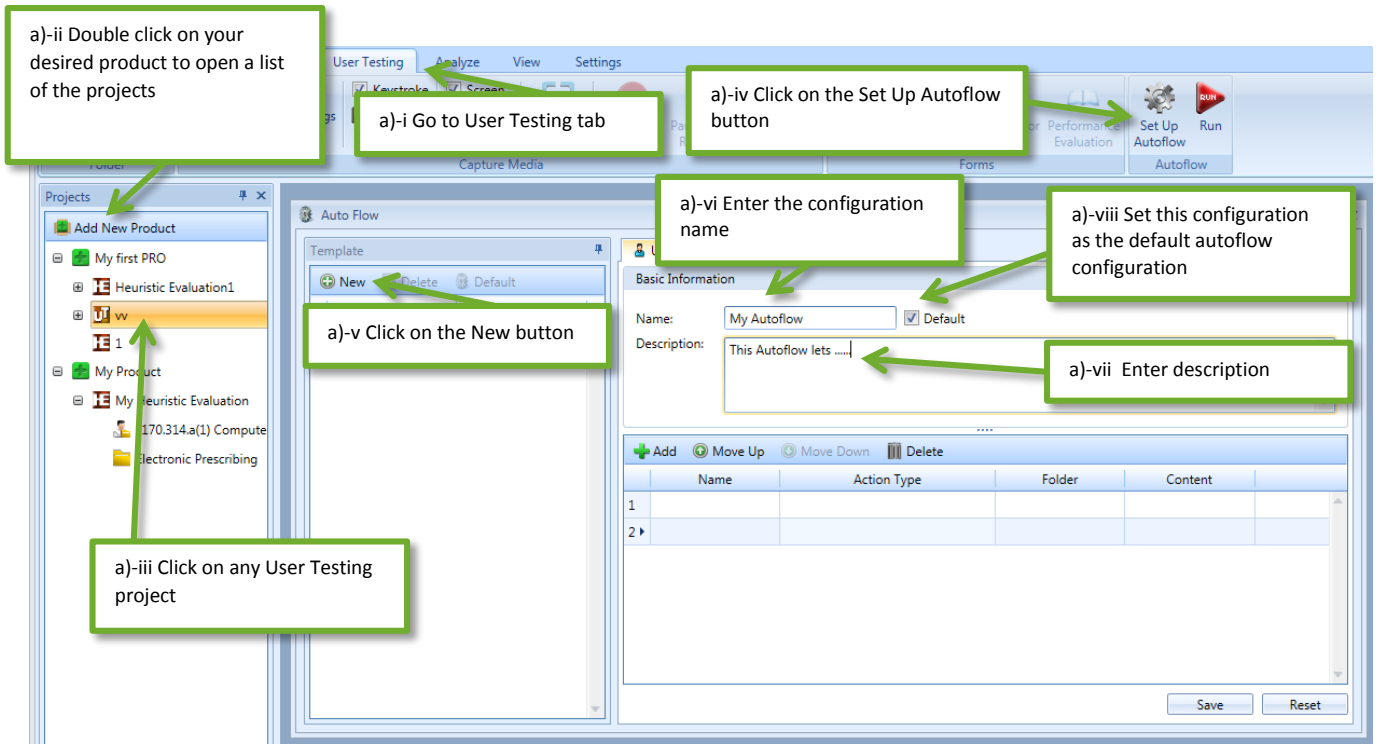
Autoflow allows the moderator to automate user testing session in a step by step fashion. The moderator can predefine actions, including, “Display PDF File”, “Display RTF File”, “Display Video File”, “Capture image”, “Fill in Demographic”, “Fill in SUS”, “Fill in Moderator Notes”, and “Fill in Performance Notes”. When you run an Autoflow session, Turf will follow the default configuration, and process its actions automatically**.**

9.2.1 Set Up Autoflow

Before a user can start using Autoflow, a configuration must first be created and designated.

a) Autoflow Configuration- Part 1

i. Go to **User Testing** tab
ii. **Double click** on your desired product to open a list of the projects
iii. **Click** on any **User Testing project**
iv. Click on the **Set Up Autoflow** button in the autoflow ribbon under the user testing tab at the top of the screen
v. In the left panel of the data capture configuration dialog, **click the new button**. This will open up an untitled screen on the right panel
vi. Enter the basic information, **enter the configuration name**
vii. **Enter the description** of the product
viii. Set this configuration as the **default** autoflow configuration by checking the default checkbox



b) Autoflow Configuration- Part 2

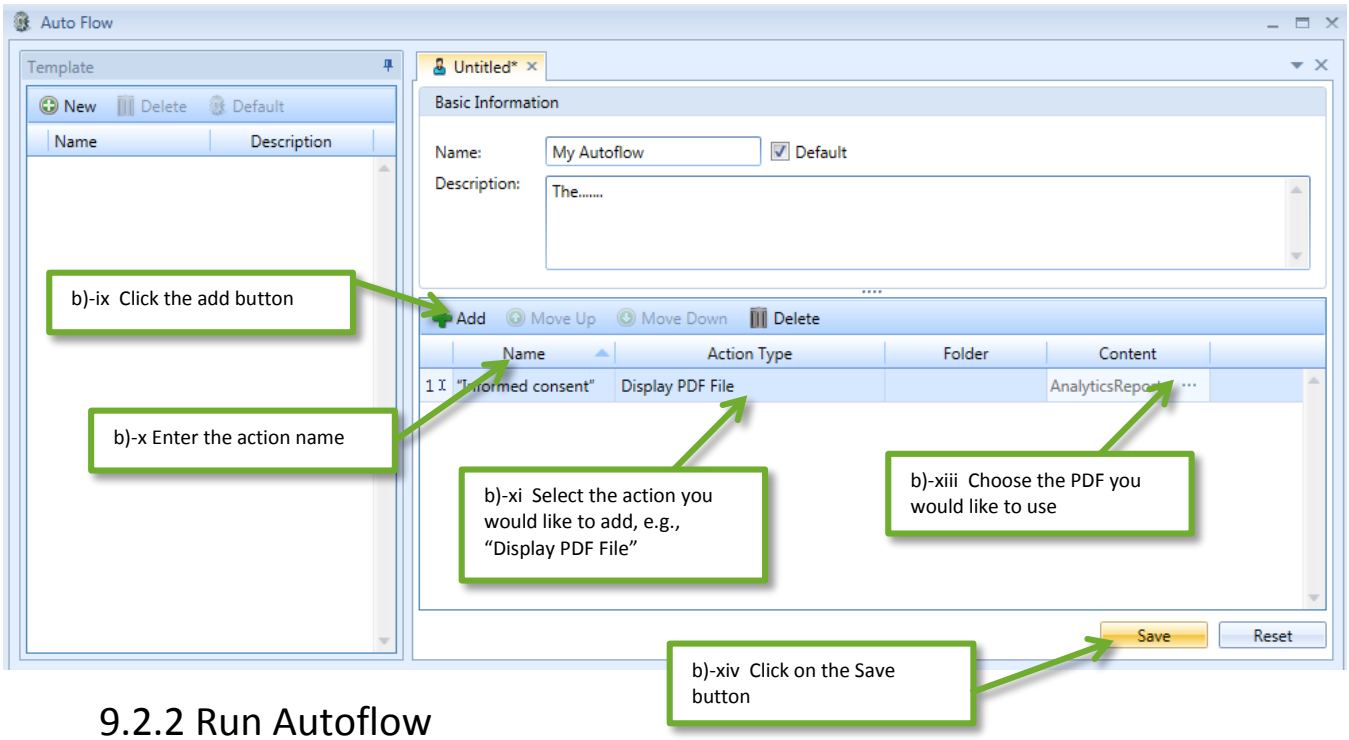
ix. Click **the add button** on the data capture configuration, to add a new action for this configuration
x. **Enter the action name**, e.g., "Informed consent"
xi. **Select Display PDf file** from the drop down menu under the "Action Type" column
xii. **Click the** button with three dots under the Content column, **a dialog will pop up** for you to choose the PDF file you want to display

xiii. **Double click on the PDF** file then you can see the name of the PDF file under the Content column

To add more actions, follow the same steps.

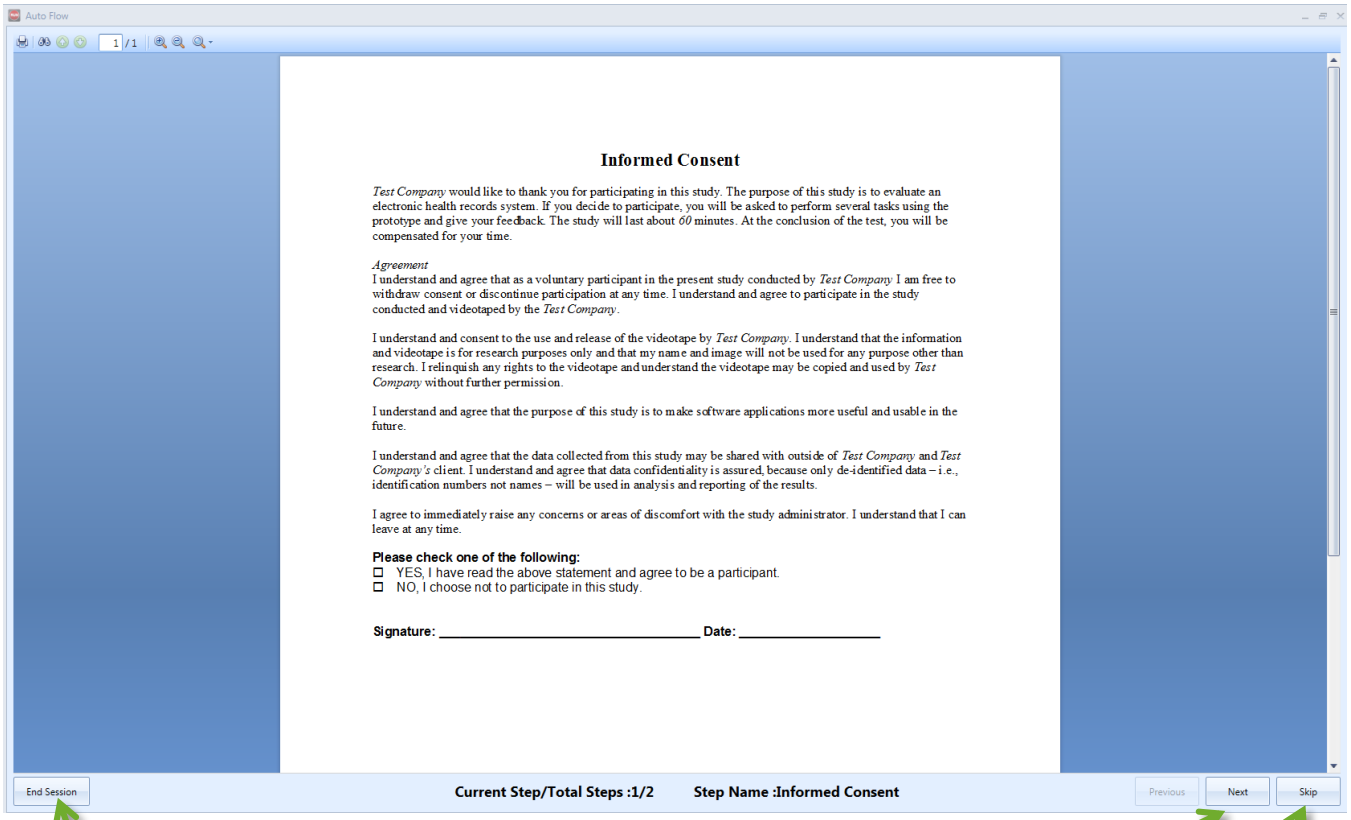
xiv. Click on the Save button

Please note that clicking the Reset button will revert the form to its original state.



9.2.2 Run Autoflow

Once the default configuration has been set, a user can start the Autoflow process. The steps will vary depending on your configuration, but the basics will be covered here. For navigation, a user can click on the **Next**, **Skip**, or **End Session** buttons. The next button will bring a user to the next step. The skip button will skip the following step and move the user to the step after. The end session button will close and save all filled information up to that point. During a screen recording session, a user or moderator can use the following keyboard shortcuts: F8 to pause the recording or F9 to stop the recording. Buttons are also available for these shortcuts at the top of the screen. Once a user has reached the last step, click the **End Session** button to finish.

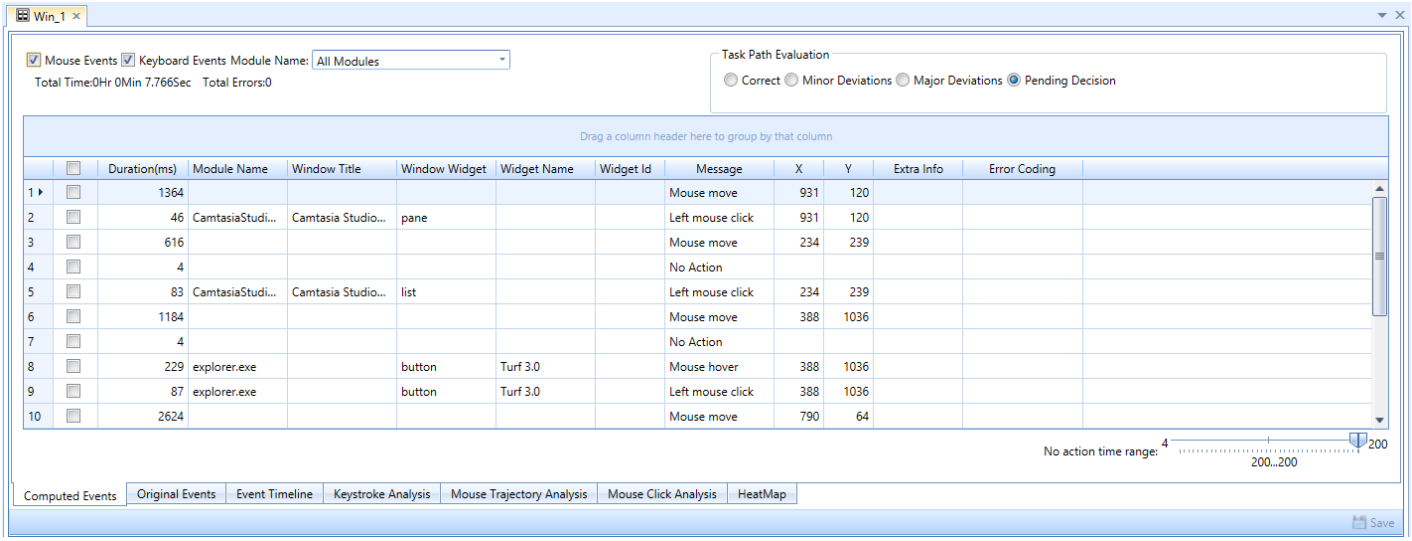


10. User Testing Analysis

Analyzing Windows Events files gives you more insight into the captured data. Clicking on Windows Events files opens up a wide screen with multiple tabs. The functions included in each tab assist you in obtaining more information regarding the captured data. The number of tabs in the latest version of Turf is 7. In the following, we will discuss each tab in more details.

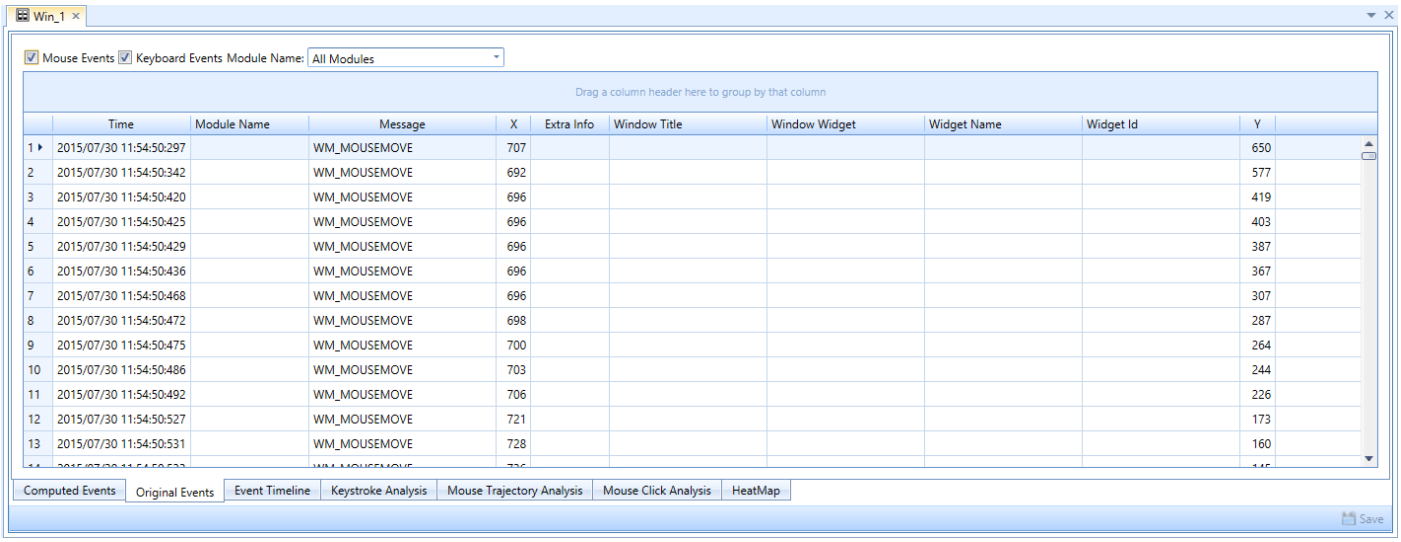
a) Computed Events

This tab allows for evaluating task paths. Here, you can choose whether or not the taken path is correct using the radio buttons listed on the right top corner of the screen. Also, you will be able to choose whether the taken path has minor or major deviations. In addition, you will get more information about the Mouse and Keyboard events associated with each captured module using the drop down box at the top of the page.



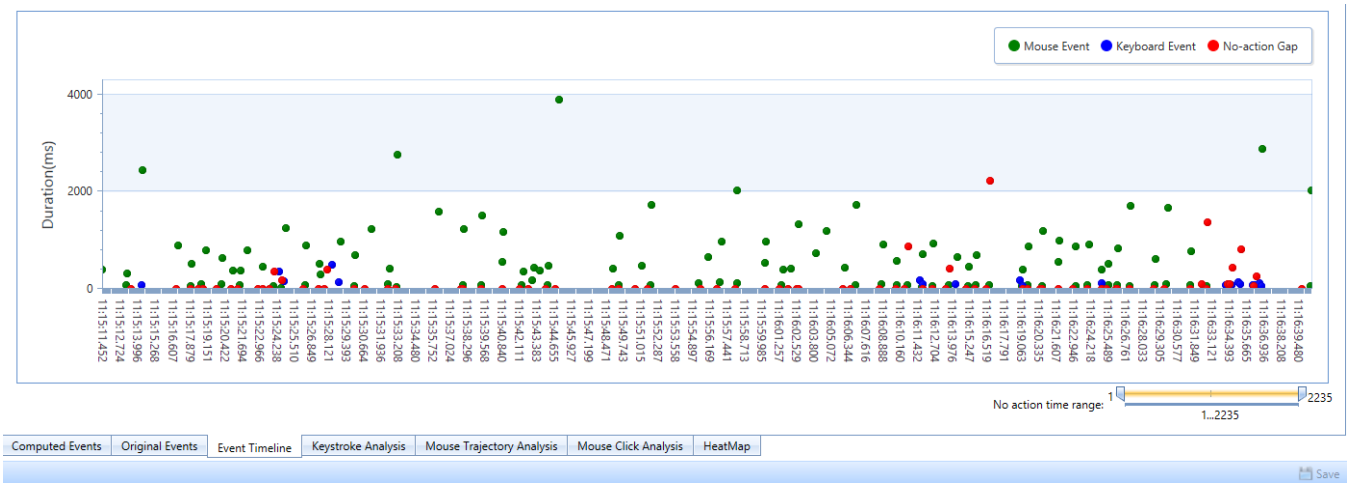
b) Original Events

On this tab, you will get more information about the mouse and keyboard events associated with each module. For example, you can see the time and data that each event was recorded.



c) Events Timeline

The duration of each recorded mouse and keyboard event in milliseconds is displayed here. Turf indicates mouse events with green dots while keyboard event are represented by blue dots. As an example, very long mouse actions might show that user is not familiar with the system or the order of the widgets on the recorded screen is not appropriate. The red dots show that the user had no action during the specified time.

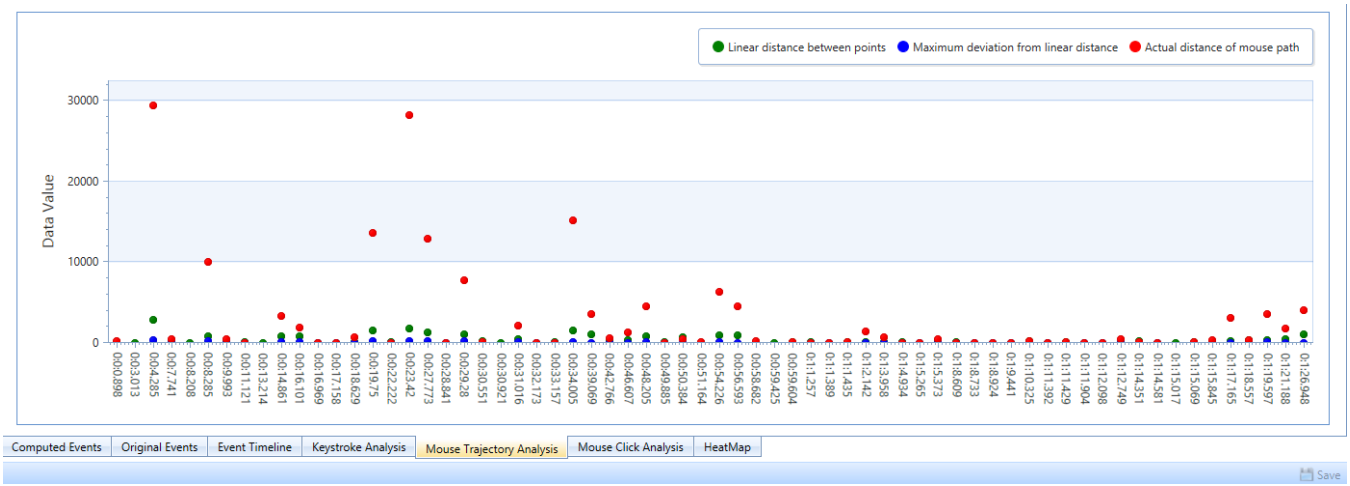


d) Keystroke Analysis

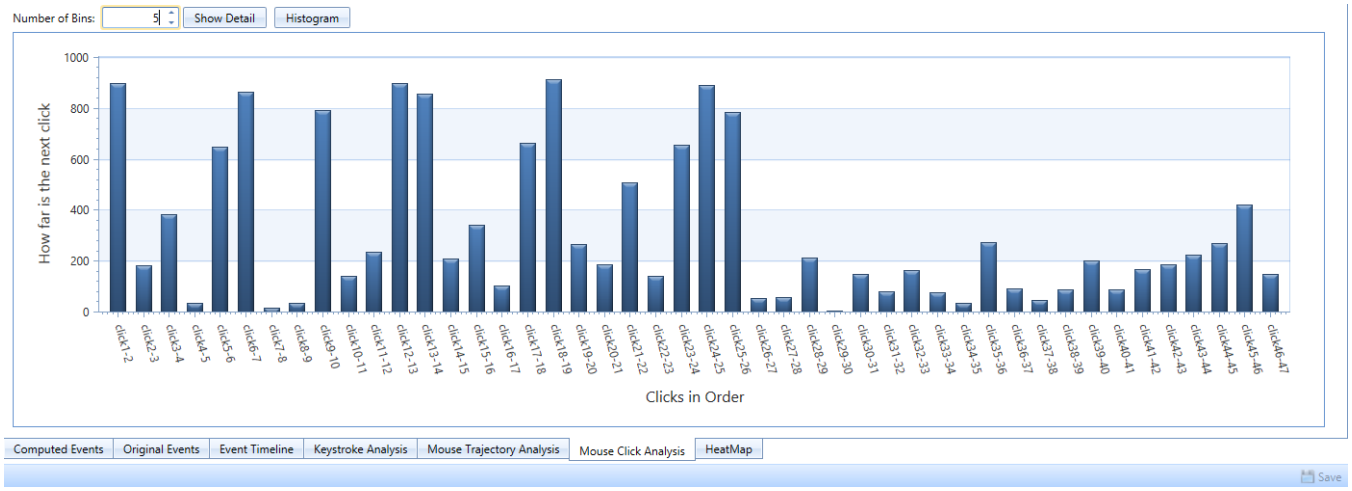
The number of typed letters and words, as well as, the number of times a user had to use the delete and backspace buttons will be displayed here.

e) Mouse Trajectory Analysis

Using this tab, you will be able to assess the effect of training and/or investigate any distracting widget which will lead to deviated path.

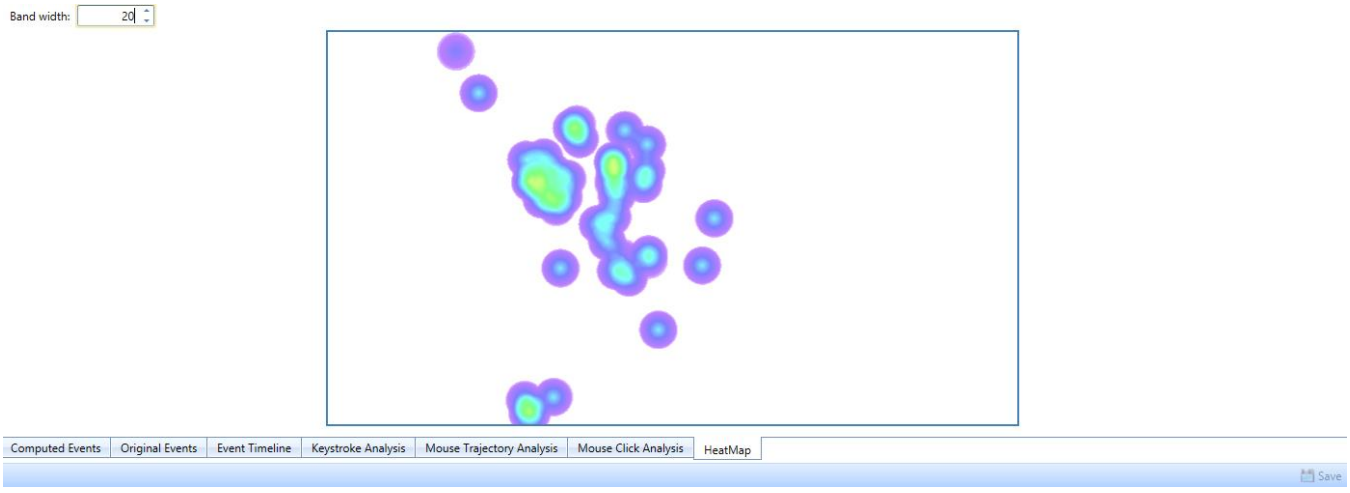


f) Mouse Click Analysis



g) Heat Map

This tab assists moderators to identify users' concentration points. The coordination of users' mouse events along with their frequency are used to generate the heat map.

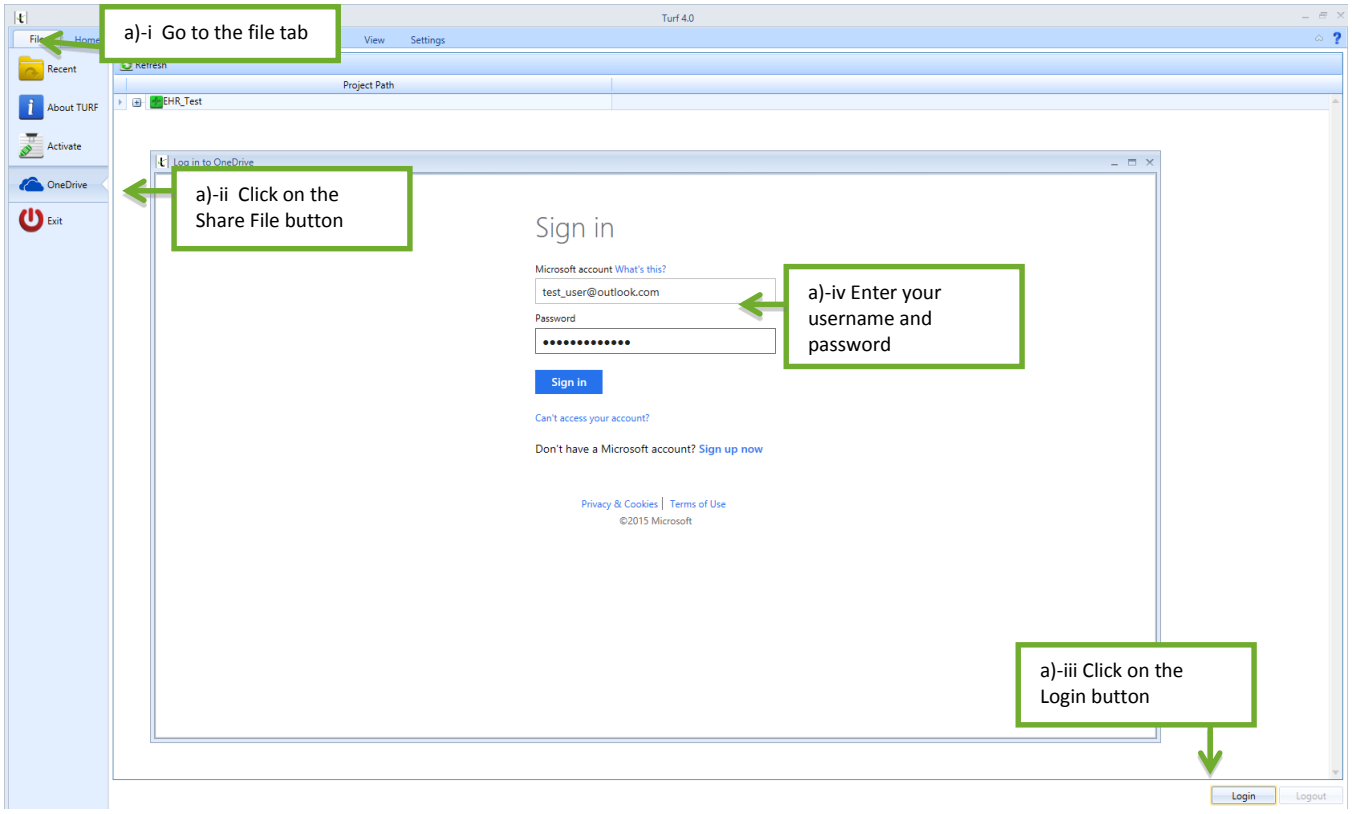


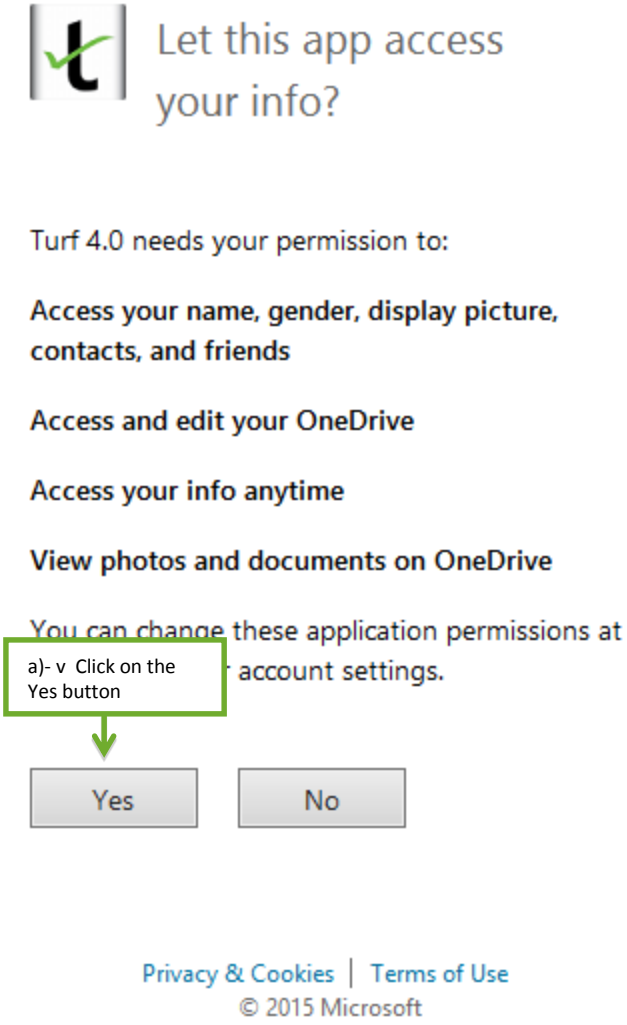
11. OneDrive-Upload/Download your projects using OneDrive

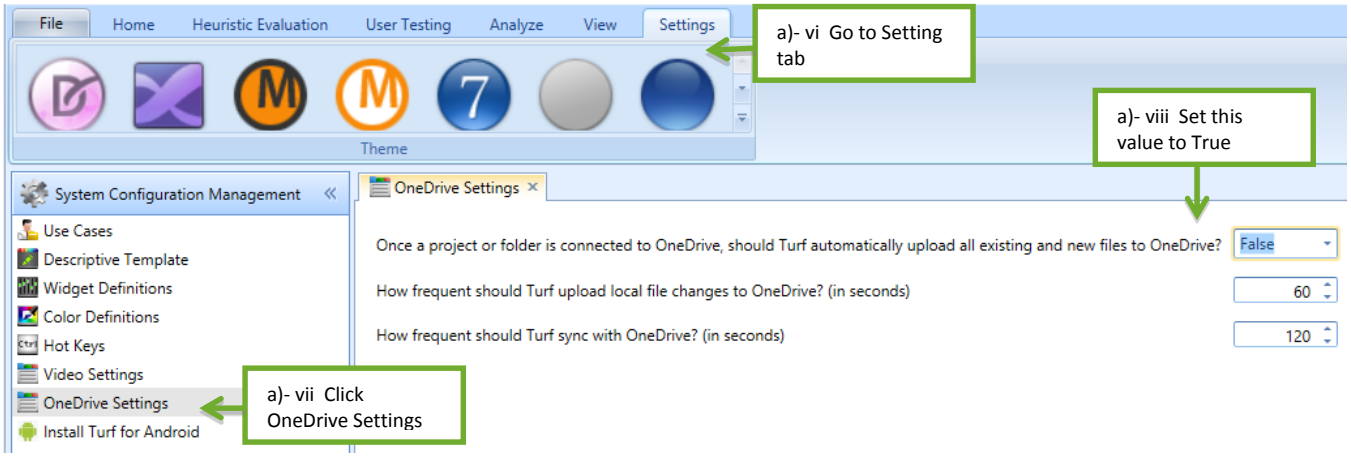
11.1 Upload to OneDrive

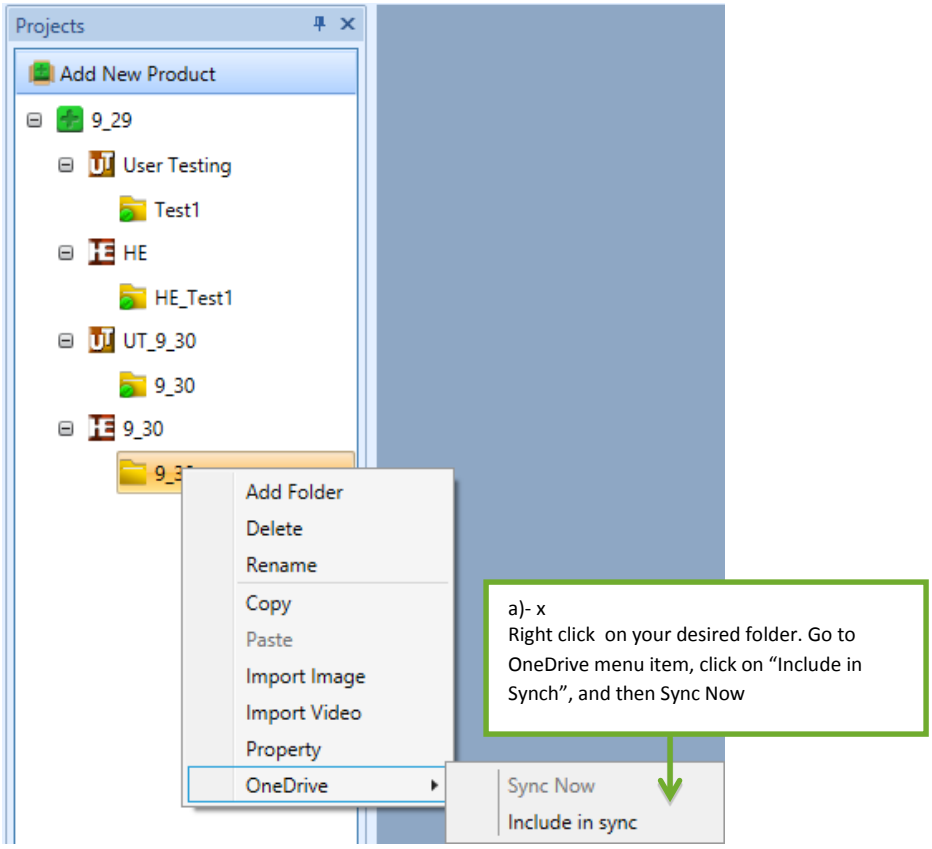
a) Follow the following steps to upload your projects to OneDrive

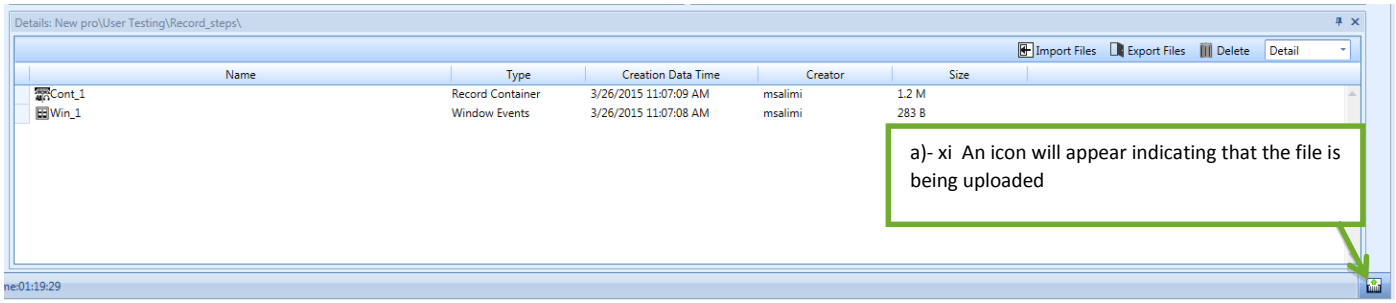
i. Go to the **File** Tab.
ii. Click **OneDrive** button on the left navigation bar
iii. Click on the **login** button at the bottom right of the screen
iv. Enter your username and password to log in to your OneDrive account. If you do not have an account, you will need to create one
v. An alert window will pop up warning that Turf will access your account info- Click on the Yes button to proceed to the next step
vi. Go to **Setting** Tab
vii. Click **OneDrive Settings** button
viii. Change the value of the first field, “Automatically upload files to OneDrive” to True, if it is set to False. Setting the value to True allows you to synch your local files with the uploaded files. This means that every changes that you make to your local files will be automatically applied to their counterparts in OneDrive.
ix. Go to the Projects panel tab- (Click on the Home tab)
x. Right click on your desired folder. Go to “OneDrive” menu item, next, click on “Include in Sync”
xi. If the value for ”Automatically upload files to OneDrive” field is not set to True, you must click “Sync Now” from the context menu.
xii. An icon on the right lower corner of the screen will appear indicating that the data are being uploaded
xiii. Upon uploading a project / folder, you will notice that TurfData4.0 folder is also created in OneDrive.This folder will include data from Turf. The organization of sub-folders is as follows: Product >> Project >> Folders >> Files.


a)-i Go to the file tab
a)-ii Click on the Share File button
a)-iii Click on the Login button
a)-iv Enter your username and password
Turf 4.0
Recent
About TURF
Activate
OneDrive
Exit
Project Path
EHR_Test
Log in to OneDrive
Sign in
Microsoft account What's this?
test_user@outlook.com
Password
Sign in
Can't access your account?
Don't have a Microsoft account? Sign up now
Privacy & Cookies | Terms of Use
©2015 Microsoft
Login
Logout


Let this app access your info?
Turf 4.0 needs your permission to:
Access your name, gender, display picture, contacts, and friends
Access and edit your OneDrive
Access your info anytime
View photos and documents on OneDrive
You can change these application permissions at
account settings.
a)- v Click on the Yes button
Yes
No
Privacy & Cookies | Terms of Use
© 2015 Microsoft


File
Home
Heuristic Evaluation
User Testing
Analyze
View
Settings
a)- vi Go to Setting tab
Theme
a)- viii Set this value to True
System Configuration Management
Use Cases
Descriptive Template
Widget Definitions
Color Definitions
Hot Keys
Video Settings
OneDrive Settings
Install Turf for Android
OneDrive Settings
Once a project or folder is connected to OneDrive, should Turf automatically upload all existing and new files to OneDrive?
False
How frequent should Turf upload local file changes to OneDrive? (in seconds)
60
How frequent should Turf sync with OneDrive? (in seconds)
120
a)- vii Click OneDrive Settings





b) If you do not want to synchronize your local data files with OneDrive:

i. Right click on your desired folder.
ii. Go to “OneDrive” menu item, click on “Exclude from Sync”.

iii. "Exclude from Sync" will simply stop syncing the files with their counterparts in OneDrive
iv. This will not remove the already uploaded data in OneDrive.
v. You can manually delete the Product / Project / File from OneDrive from any OneDrive app

11.2 Sharing Turf data on OneDrive with other team members

Do you want to import the Turf files that your team members have worked on into your Turf application? It is simple, as long as they have shared these data with you on OneDrive.

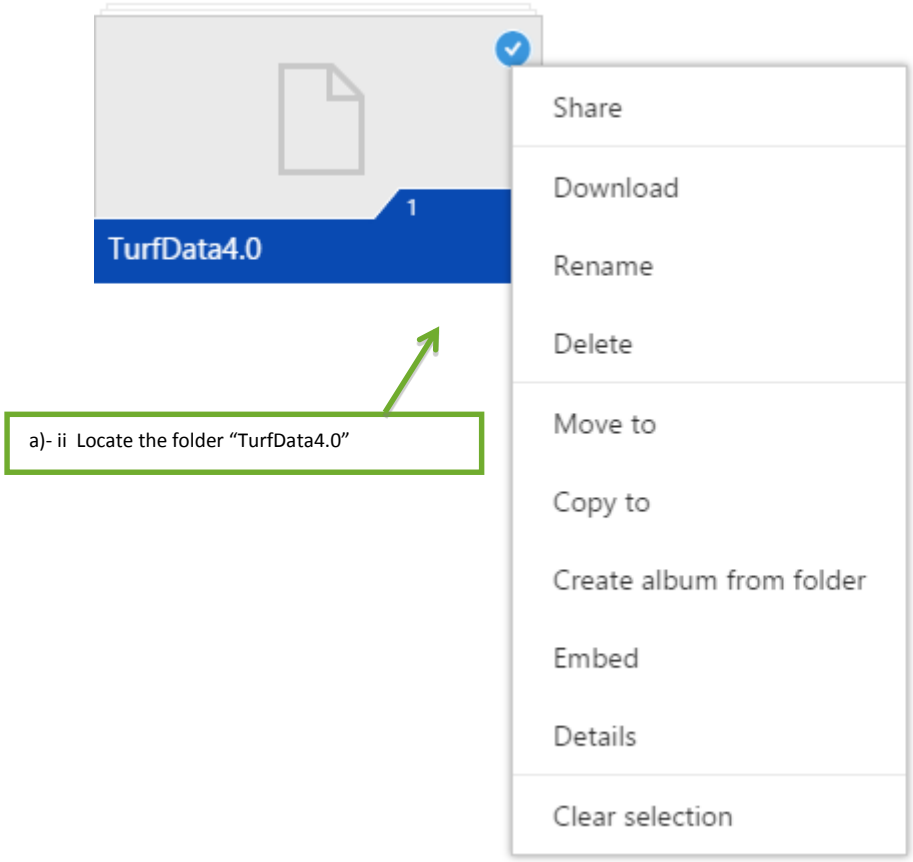
a) Sharing your Turf data with others:

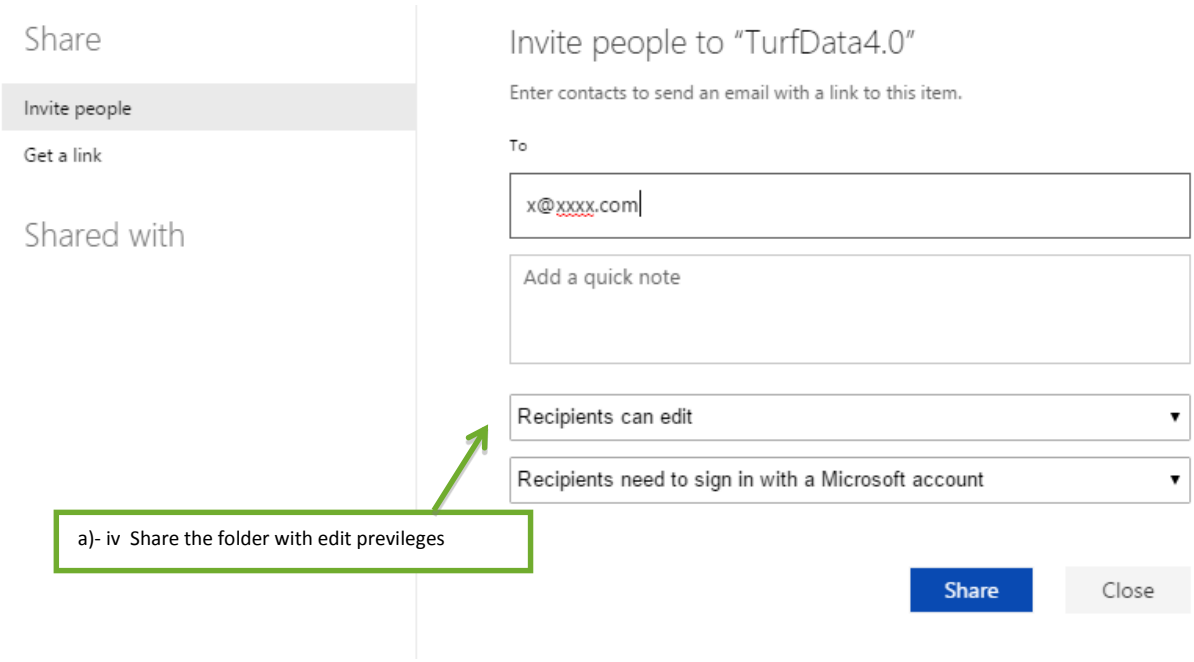
To share data with others, you need to access to your OneDrive folder:

i. Use your browser or any OneDrive applications to go to your OneDrive account where you will be able to share your files with others
ii. Locate the folder "TurfData4.0".
iii. Select the folder and edit its share options.
iv. Share the folder with Edit previleges.
v. The shared user will get an email notification.

Accepting shared data from others

If someone has shared their Turf data with you, you will receive an email notification about the share. Follow the instructions in the email to accept the share. You need not add the shared folder to your OneDrive. Simply accepting the share will be naough. You should be able to access the folder under Shared Files section in OneDrive.


1
TurfData4.0
Share
Download
Rename
Delete
Move to
Copy to
Create album from folder
Embed
Details
Clear selection
a)- ii Locate the folder “TurfData4.0”



11.3 Importing Turf data from OneDrive

Are your User Testing or Heuristic Evaluation files damaged? Or do you want to download the folders that your teammates have shared with you on OneDrive into Turf?

In general, the file (s) /folder (s) that are uploaded to OneDrive can be imported into a Turf project, or product. They come from two different sources: (1) The ones that you have already uploaded to OneDrive, or (2) the ones that your colleagues have shared with you on OneDrive.

To import a project from OneDrive to a Turf product:
Right click on a product >> Go to OneDrive >> Select import a project from the OneDrive menu item.

Similarly, to import a folder to a Turf project:
Right click on a project >> Go to OneDrive >> Select import a folder from the OneDrive menu item.

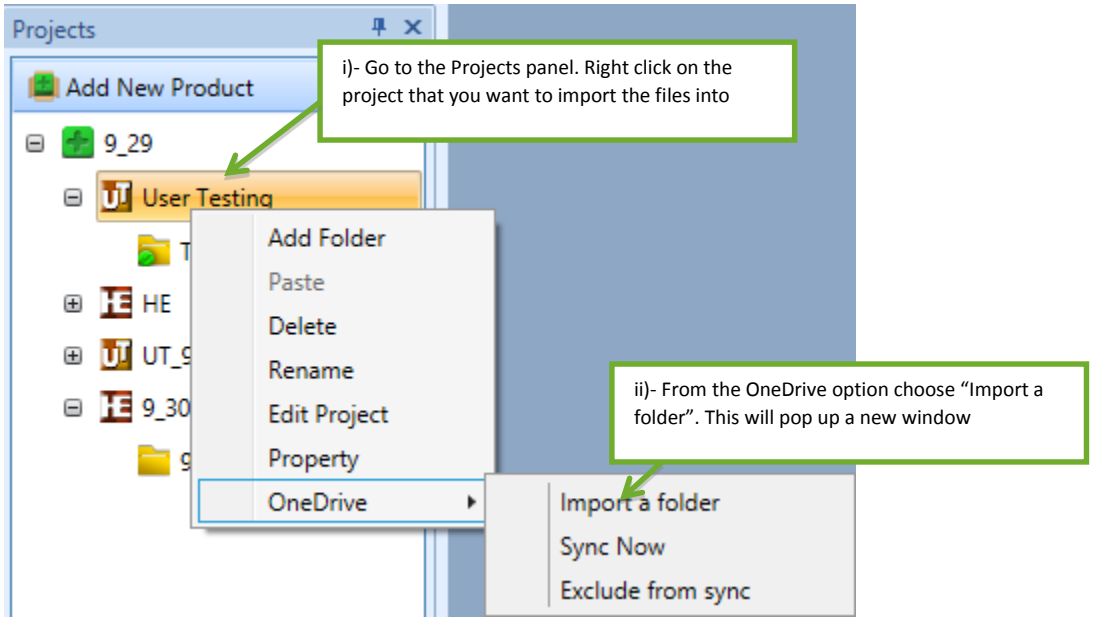
The files/folders that you have uploaded to OneDrive will be displayed in "My Files" tab, whereas, the files that your teammates have shared with you will be displayed on "Shared Files" tab.

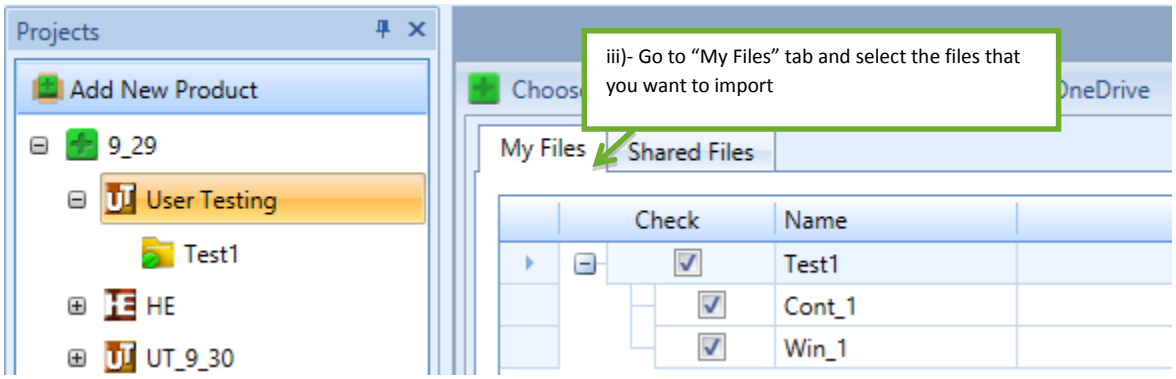
When importing a Project or Folder to "My Files" tab, you will only see the folders and files that are synced with that particular project and folder. This means that you will not be able to import folders or files from a different project or product using OneDrive function. However, if you use "Shared Files" tab, you will be able to import any projects / folders / files to your local projects or folders .

The following steps demonstrate how you can **import** your uploaded data files to a **project folder**:

i. Go to the Projects panel. Right click on the project that you want to import the files into.
ii. From the OneDrive menu item, choose "Import a folder". This will pop up a new window.
iii. The new window contains two tabs, "My Files", and "Shared File". Go to "My Files" tab and select the files that you want to import

iv. Click OK button





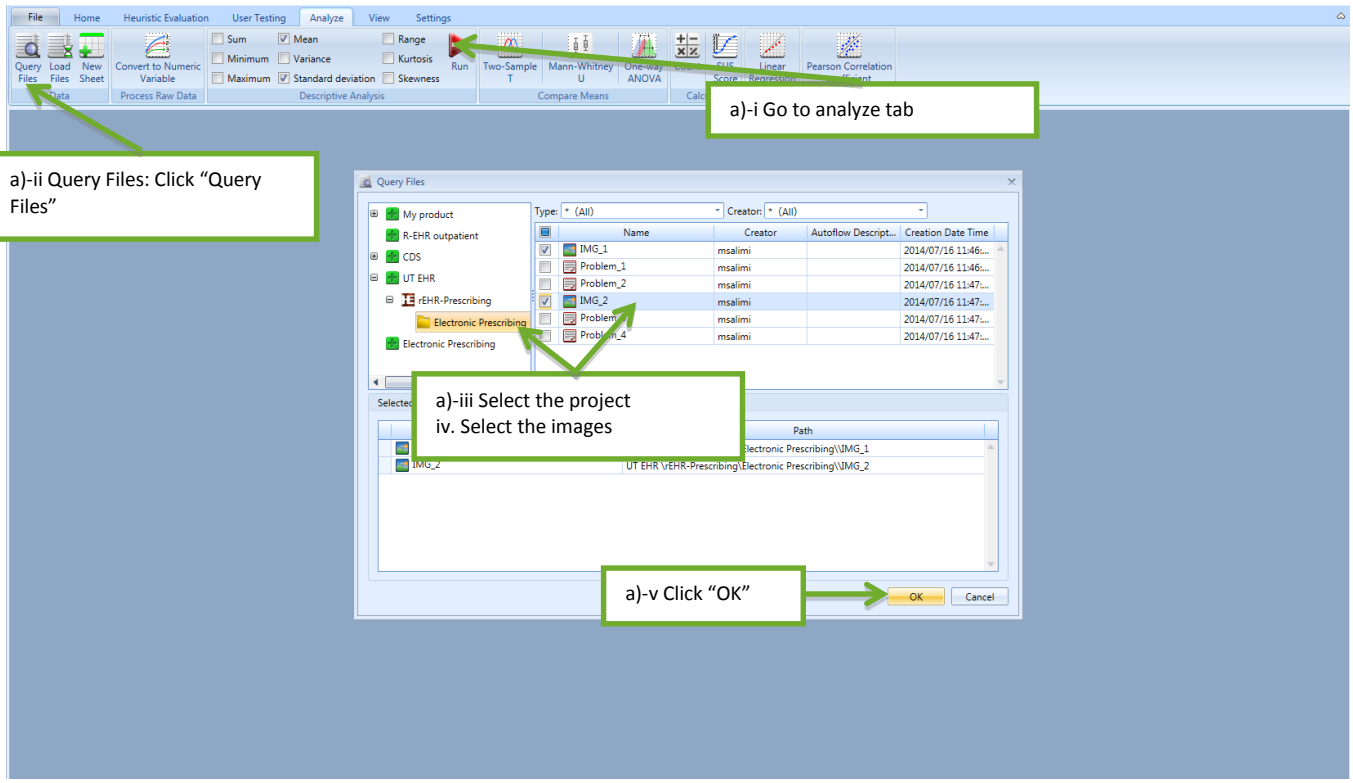
12. Analytic Procedures

12.1 How to Process Raw Data

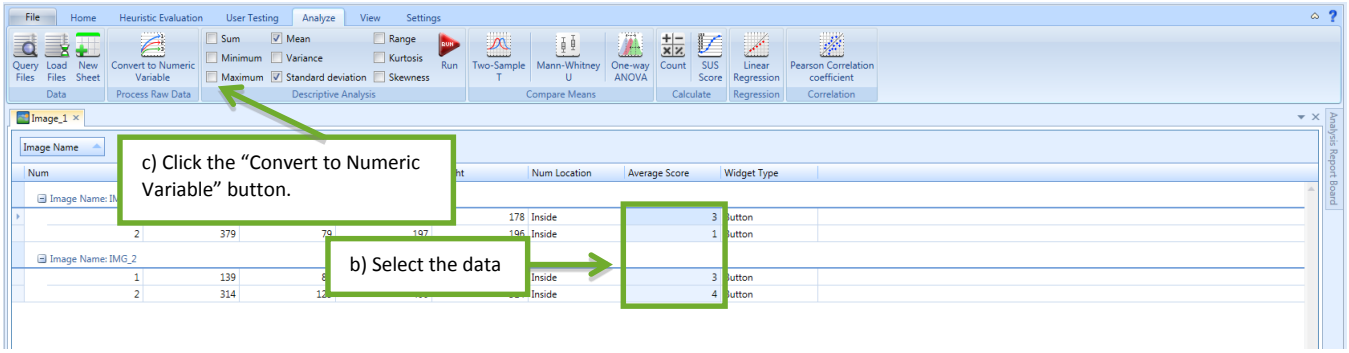
Most of the statistical techniques can be used only with numeric data. During data collection, numeric data may be stored as other data types, such as a string. The **Convert to Numeric Variable** function can be used to convert the data from other types to numerical type.

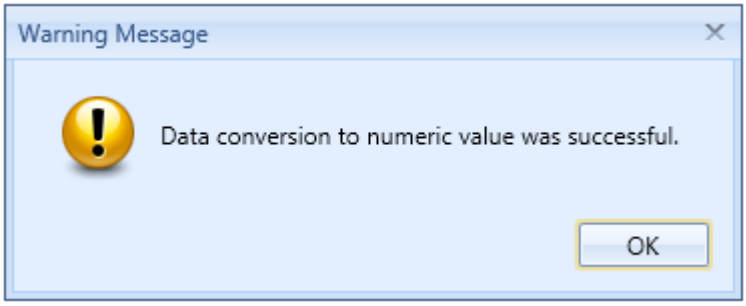
a) Query Files:

i. Go to **Analyze tab**
ii. Click **Query Files**
iii. Select a product, e.g. **Demo EHR ->** Select a project, e.g. **Heuristic Evaluation 1** -> Select a folder, e.g.: **Electronic prescribing ->**
iv. **Select** the images where usability problems have been identified in previous steps
v. Click **OK**



b) Select the **numeric** data. To select multiple rows, hold down Ctrl button while clicking on each row
c) Click the **Convert to Numeric Variable** button





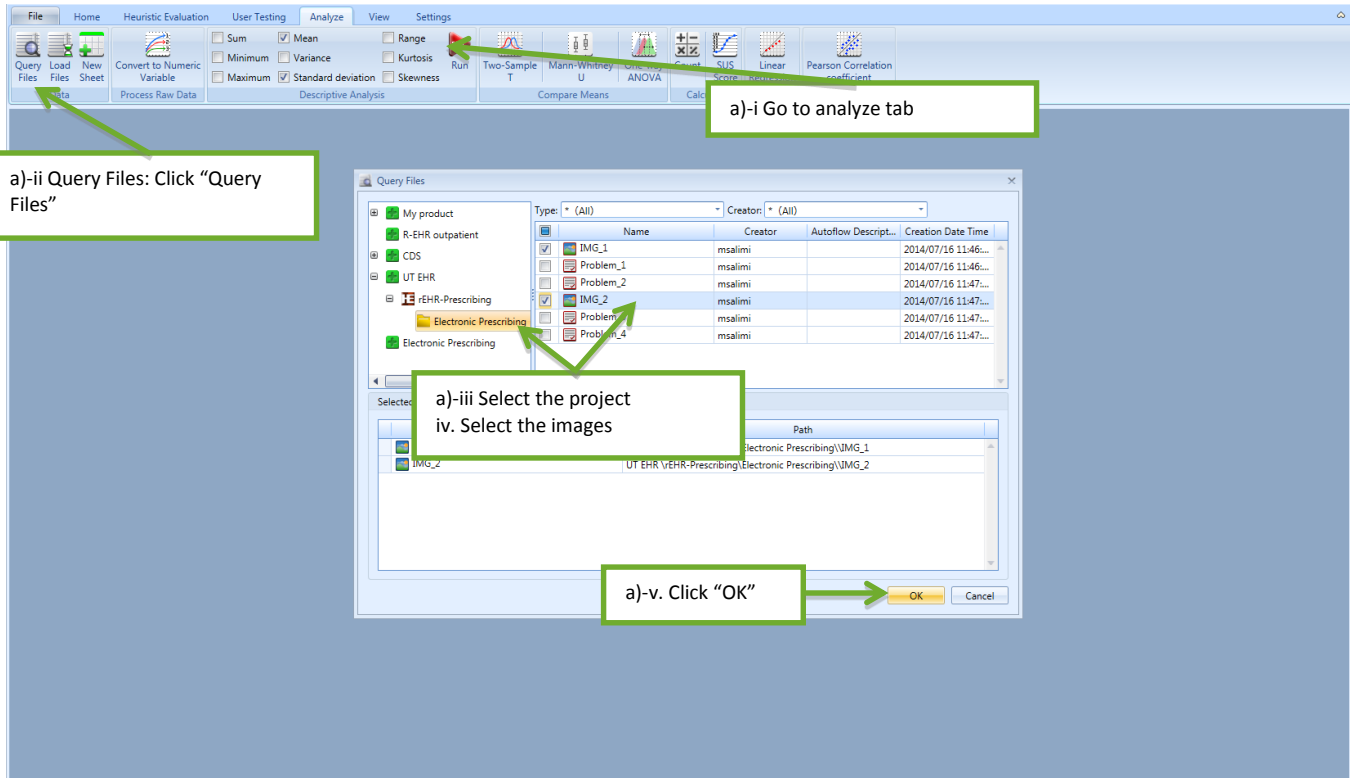
12.2 How to Do Descriptive Analysis

The descriptive analysis within Turf include calculating the sum, mean, variance, standard deviation, range, minimum and maximum data, kurtosis and skewness. You choose the analytic method(s) that you want to apply, and then generate analysis results. These descriptive analysis results may help to assess the overall usability level of a product and identify the major usability problems. The Descriptive Analysis can be done with data collected from Heuristics Evaluation as well as User Testing.

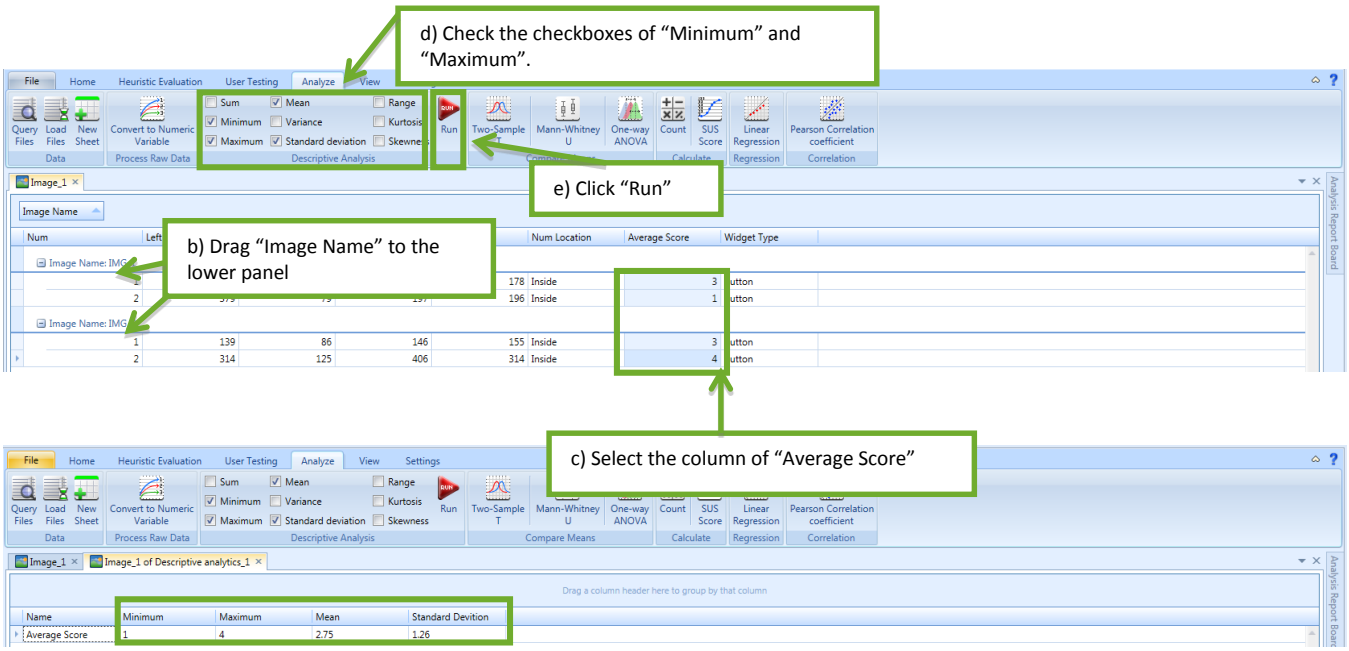
Calculate the mean, range, minimum and maximum of severity scores:

For the severity scores assigned to problems, we are interested in the mean of severity scores, also the range, minimum and maximum scores. The following instructions are based on the data collected from Heuristic evaluation. However, it can also be done on the data collected from User Testing.

a) Query Files:
   i. Go to **Analyze** tab
   ii. Click **Query Files**
   iii. Select a product, e.g. **Demo EHR ->** Select a project, e.g. **Heuristic Evaluation 1** -> Select a folder, e.g.: **Electronic prescribing ->**
   iv. Select the images where usability problems have been identified in previous steps
   v. Click **OK**



b) Drag the **Image Name** to the lower panel. By doing this, the Image Name will be added to the existing columns and the name of images falls under this heading.
c) Select the column of **Average Score**
d) Check the checkboxes of **Minimum** and **Maximum**
e) Click the Run button



Here, Turf displays the descriptive analysis results based on your selections.

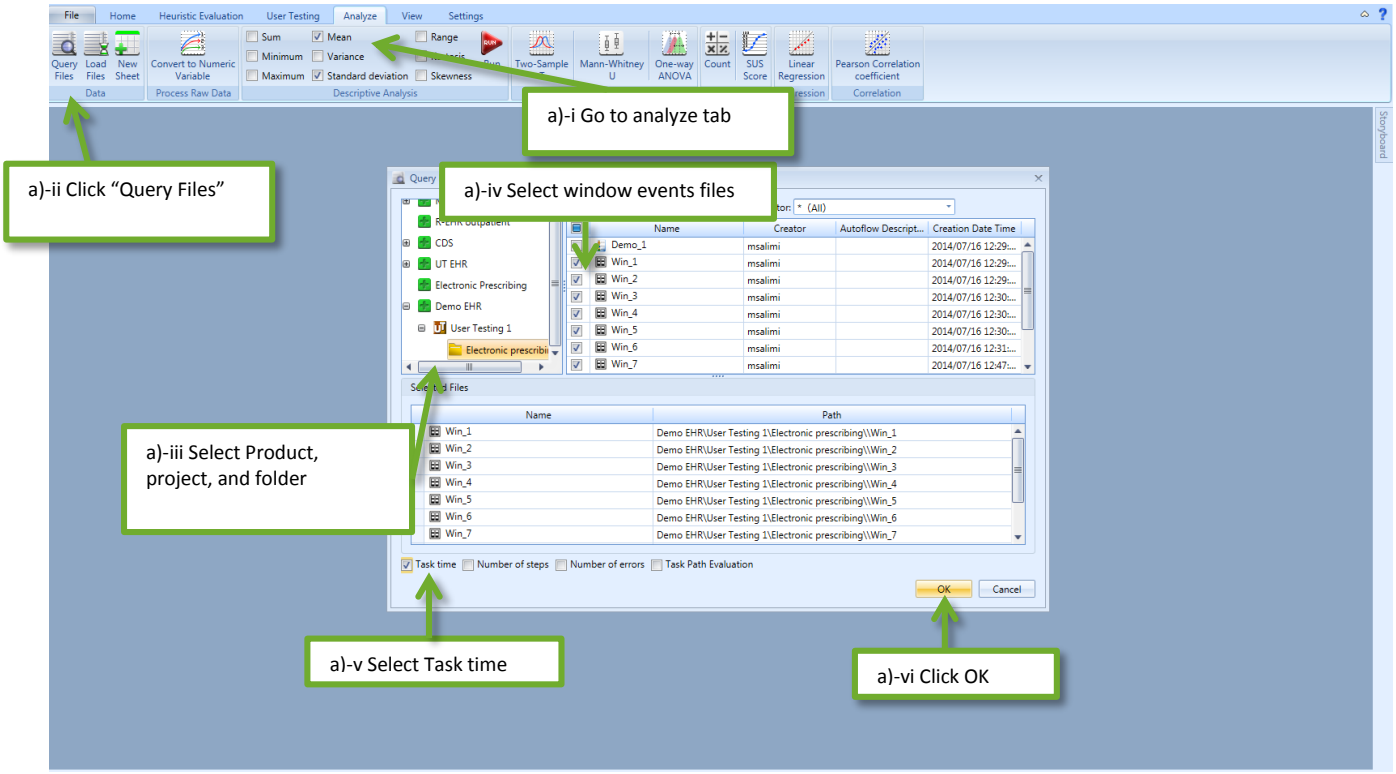
12.3 How to Compare Means

12.3.1 Two-Sample T test

Two-Sample T test helps to determine whether the means of two different data sets differ. For example, a group of physicians was asked to do E-prescribing using EHR1, another group of physicians was asked to do the same task using EHR2. Now, we are interested in comparing the mean task time for E-prescribing based on the data collected from both groups. **Note:** The Two-Sample T test only focuses on two different sets of data, and requires that the distribution of data be normal**.** If you need to compare means among multiple data sets, other hypothesis tests, such as One-way ANOVA should be used.

b) Query task time

i. Go to **Analyze tab**
ii. Click **Query Files** button
iii. Select a product, e.g. **Demo EHR ->** Select a project, e.g. **User Testing 1** -> Select a folder, e.g.: **Electronic prescribing ->**
iv. Select windows event files, e.g.: **Win_1 to Win_10.**
v. Select **Task time**
vi. Click **OK**



c) **Add categorical columns**

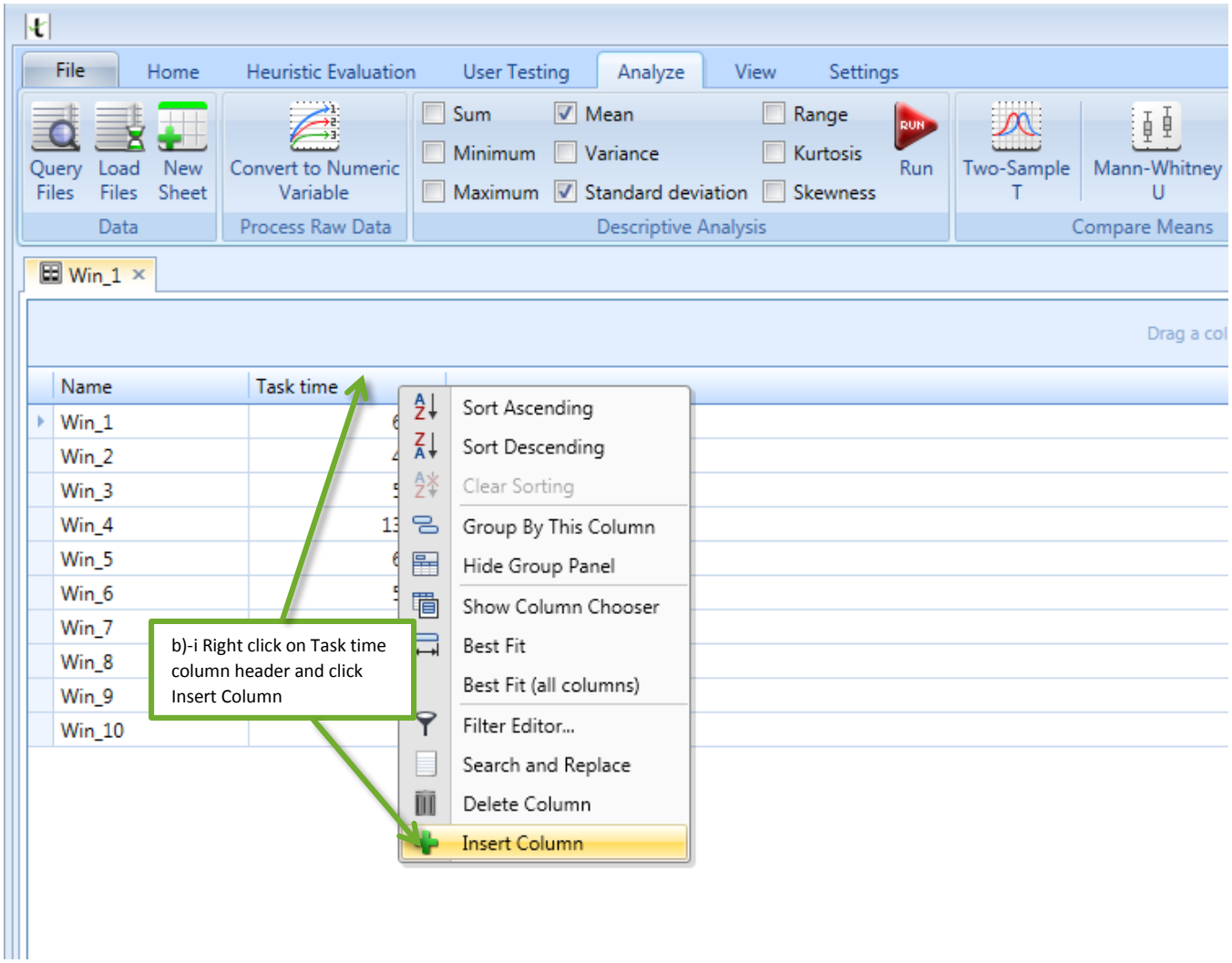
i) Right click on **Task time** and click **Insert Column**. The “column data table” window pops up, where you can set values for the following properties: “Column Name, Data Type, Selected Column Left, and Selected Column Right.

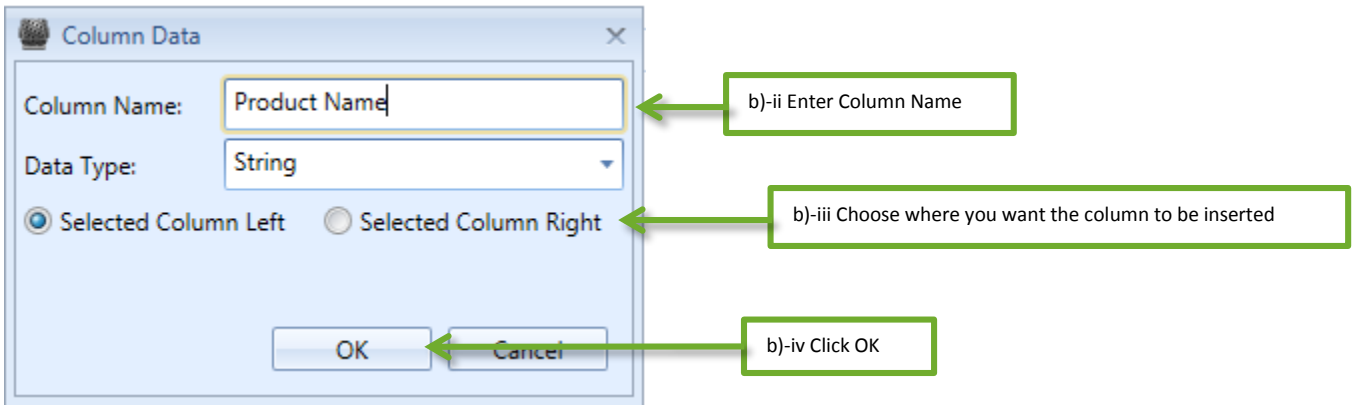
ii) Enter **Column Name**, e.g.: **Product Name.** The data type is preselected on “String”. String indicates the data type of the value entered in Column Name. String data type represents text rather than numbers. Also, it consists a set of characters that can contain spaces and numbers.

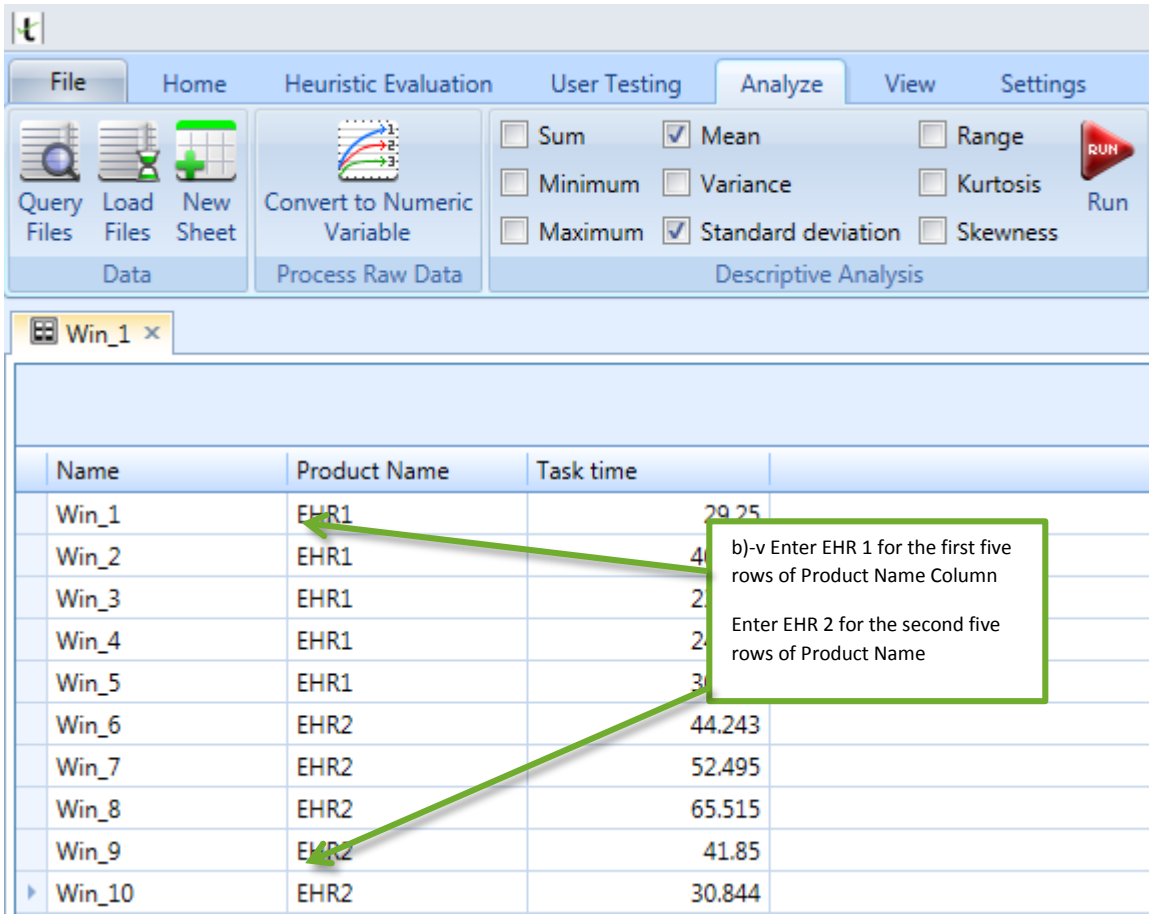
iii) Choose where you want the column to be inserted, before or after the current column**.**

iv) Click **OK**

v) Enter EHR 1 for the first five rows of Product Name Column to indicate it’s Product 1, enter EHR 2 for the last five rows of Product Name Column to indicate it’s Product 2


File
Home
Heuristic Evaluation
User Testing
Analyze
View
Settings
Query Files
Load Files
New Sheet
Data
Convert to Numeric Variable
Process Raw Data
Sum
Mean
Range
Minimum
Variance
Kurtosis
Maximum
Standard deviation
Skewness
Run
Descriptive Analysis
Two-Sample T
Mann-Whitney U
Compare Means
Win_1
Drag a col
Name
Task time
Win_1
Win_2
Win_3
Win_4
Win_5
Win_6
Win_7
Win_8
Win_9
Win_10
Sort Ascending
Sort Descending
Clear Sorting
Group By This Column
Hide Group Panel
Show Column Chooser
Best Fit
Best Fit (all columns)
Filter Editor...
Search and Replace
Delete Column
Insert Column
b)-i Right click on Task time column header and click Insert Column


Column Data
Column Name:
Product Name
Data Type:
String
Selected Column Left
Selected Column Right
OK
Cancel
b)-ii Enter Column Name
b)-iii Choose where you want the column to be inserted
b)-iv Click OK



c) Calculate

i) Select **Product Name** and **Task time** Column (select Product Name/Task time, hold down Shift /Ctrl button and select another column)

ii) Click **Two-Sample T** button

iii) Add **Product Name** as **Group Variable**

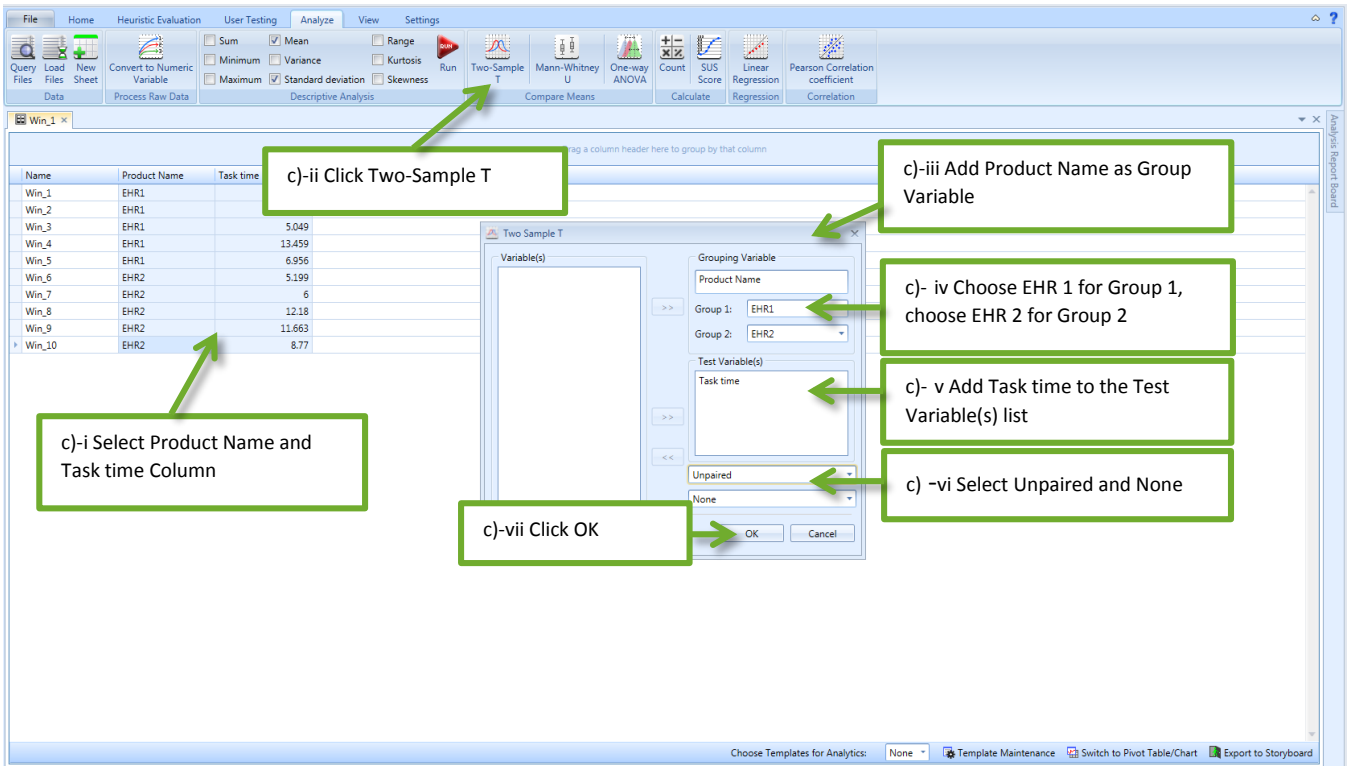
iv) Choose **EHR 1** for **Group 1,** choose **EHR 2** for **Group 2**

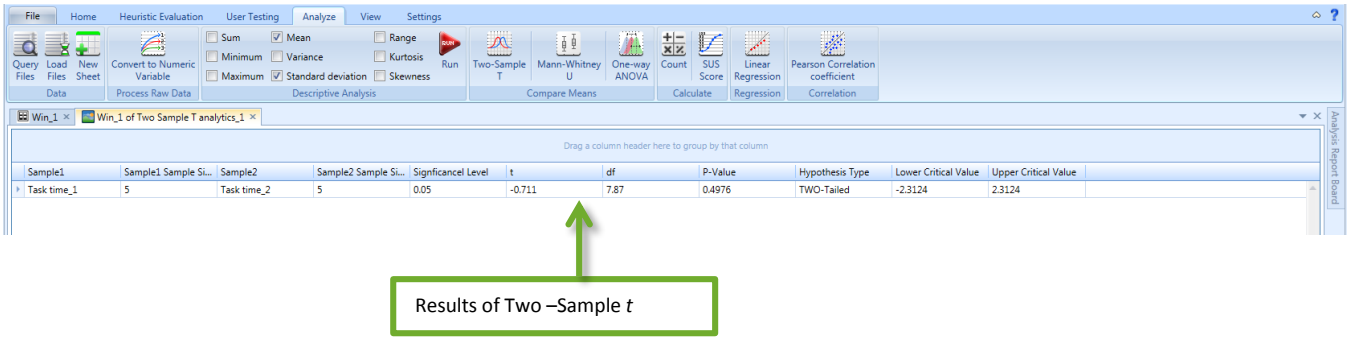
v) Add **Task time** to the **Test Variable(s)** list. By doing this step, you indicate that Task time is the criteria on which different products are to be compared with each other.

vi) **If two different groups of users involved in User Testing evaluation, you need to choose "Unpaired", otherwise "Paired" should be selected**

vii) Select **None**

viii) Click **OK**





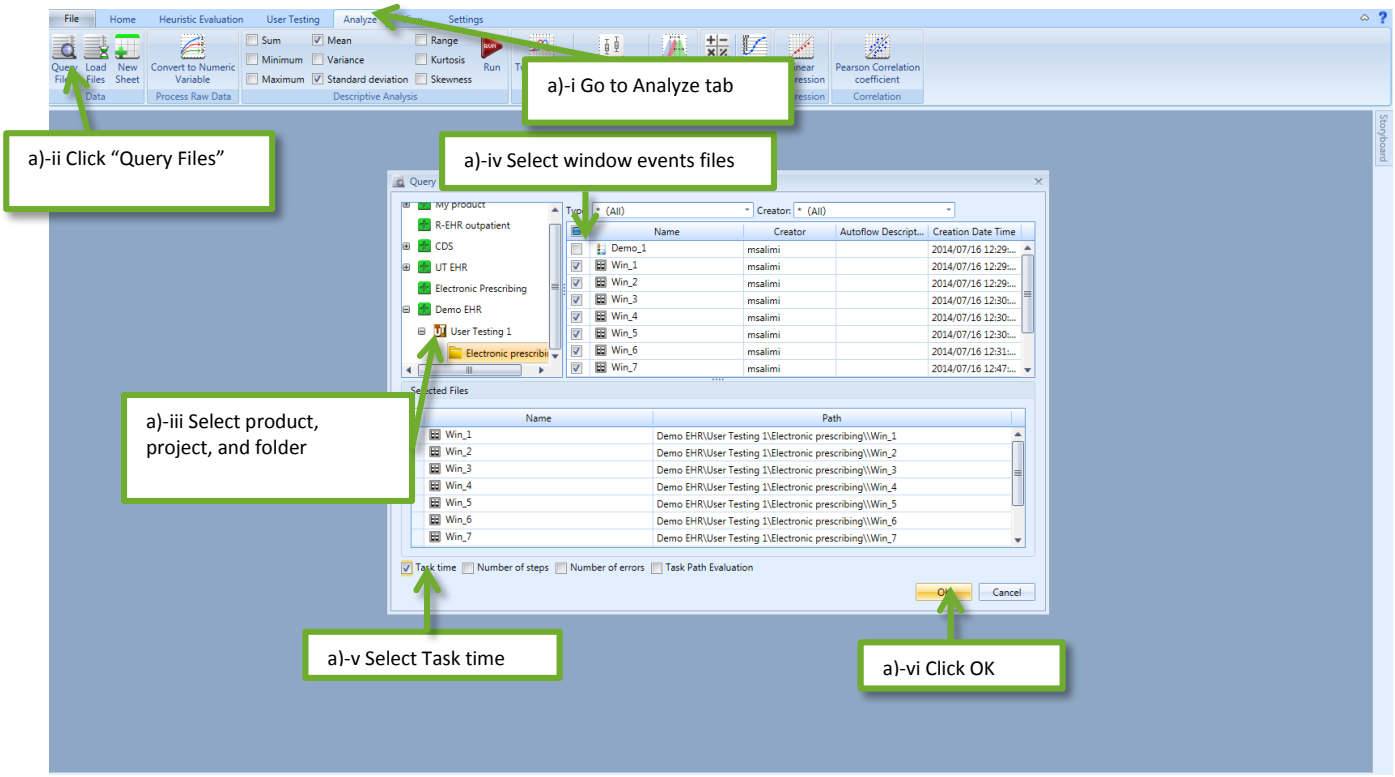
12.3.2 Mann-Whitney U test

Sometimes data is not normally distributed or the samples sizes are so small that one cannot tell whether they are part of a normal distribution or not. In these cases you need to use the non-parametric Mann-Whitney U test.

a) Query task time

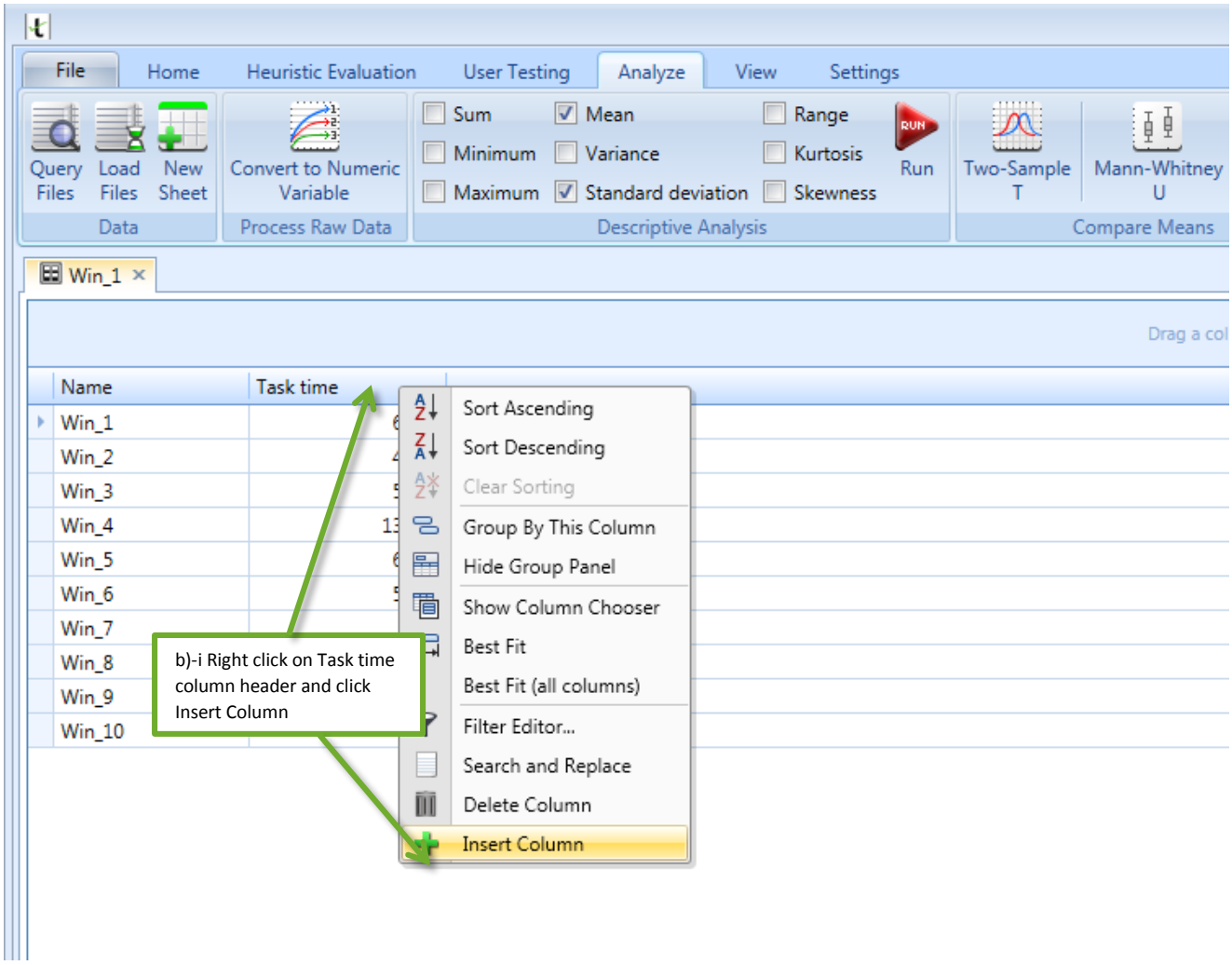
i) Go to Analyze tab
ii) Click **Query Files** button.
iii) Select a product, e.g. **Demo EHR ->** Select a project, e.g. **User Testing 1** -> Select a folder, e.g.: **Electronic prescribing ->**

iv) Select windows event files, e.g.: **Win_1 to Win_10.**
v) Select **Task time**
vi) Click **OK**



b) Add categorical columns

i) Right click on **Task time** and click **Insert Column**
ii) Enter **Column Name**, e.g.: **Product Name**. The data type is preselected on "String". String indicates the data type of the value entered in Column Name. The String data type includes alphabetic characters rather than numbers. Also, it allows characters that can contain spaces and numbers.
iii) Choose where you want the column to be inserted, before or after the current column
iv) Click **OK**
v) Enter EHR 1 for the first five rows of Product Name Column to indicate it's Product 1, enter EHR 2 for the last five rows of Product Name Column to indicate it's Product 2


File
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User Testing
Analyze
View
Settings
Query Files
Load Files
New Sheet
Data
Convert to Numeric Variable
Process Raw Data
Sum
Mean
Range
Minimum
Variance
Kurtosis
Maximum
Standard deviation
Skewness
Run
Descriptive Analysis
Two-Sample T
Mann-Whitney U
Compare Means
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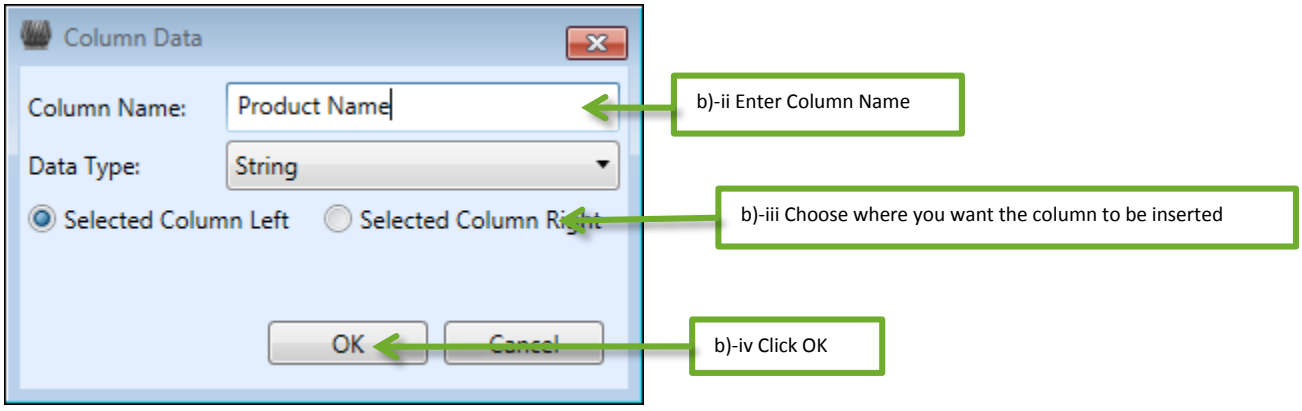
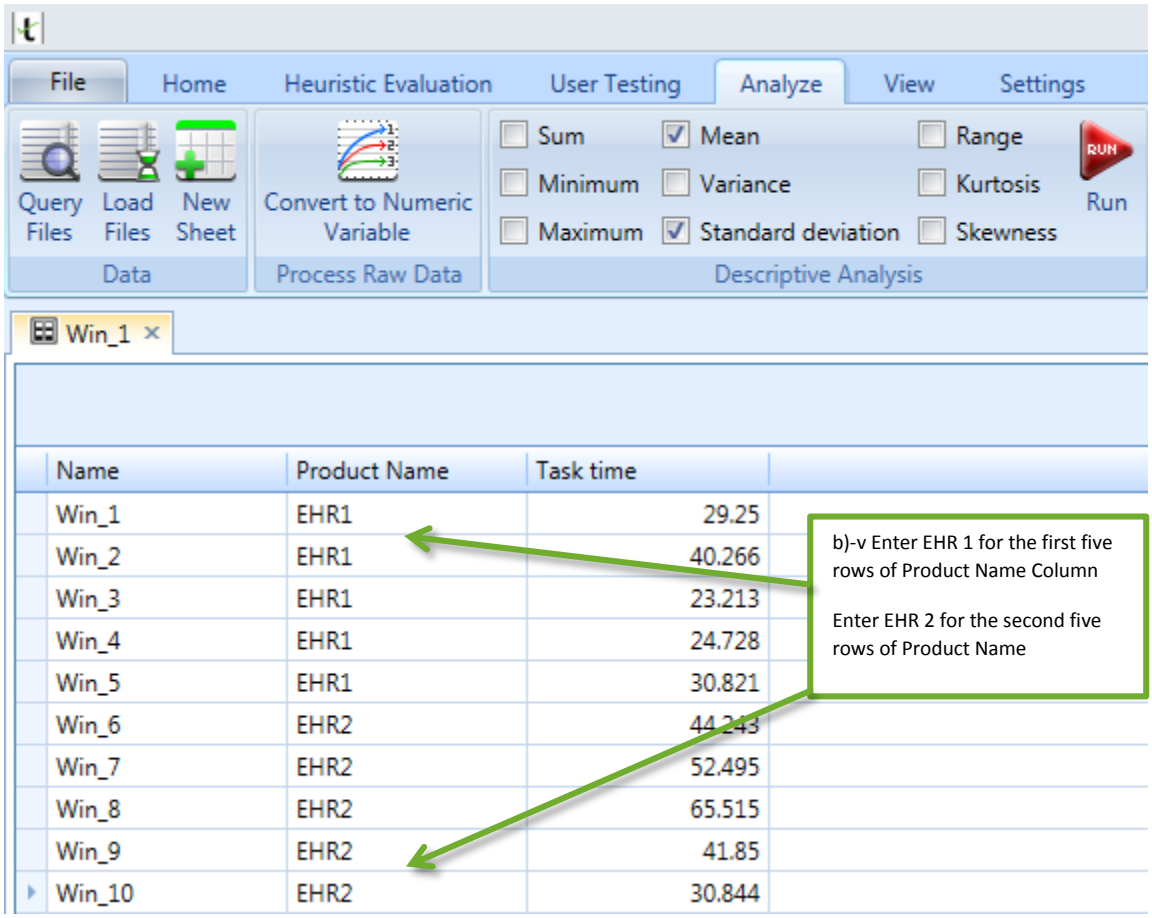
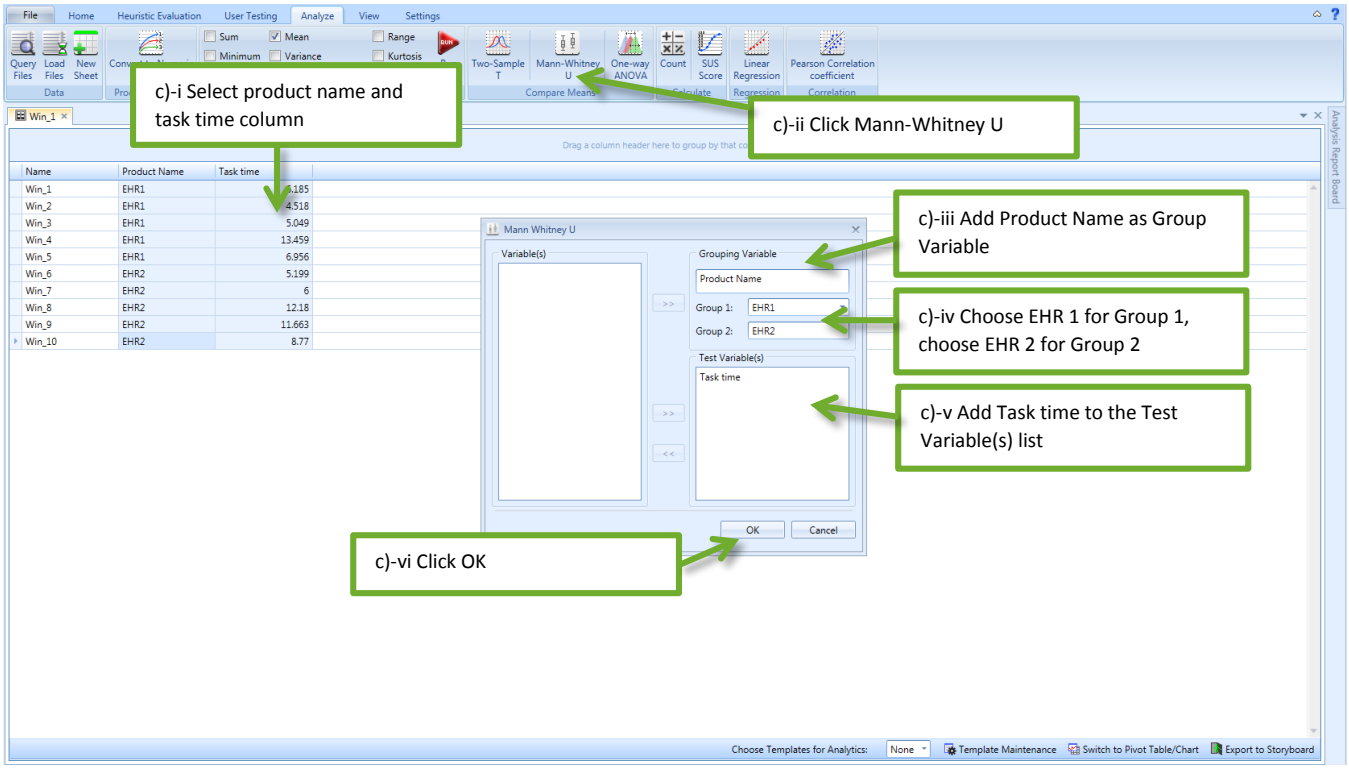
Drag a col
Name
Task time
Win_1
Win_2
Win_3
Win_4
Win_5
Win_6
Win_7
Win_8
Win_9
Win_10
Sort Ascending
Sort Descending
Clear Sorting
Group By This Column
Hide Group Panel
Show Column Chooser
Best Fit
Best Fit (all columns)
Filter Editor...
Search and Replace
Delete Column
Insert Column
b)-i Right click on Task time column header and click Insert Column

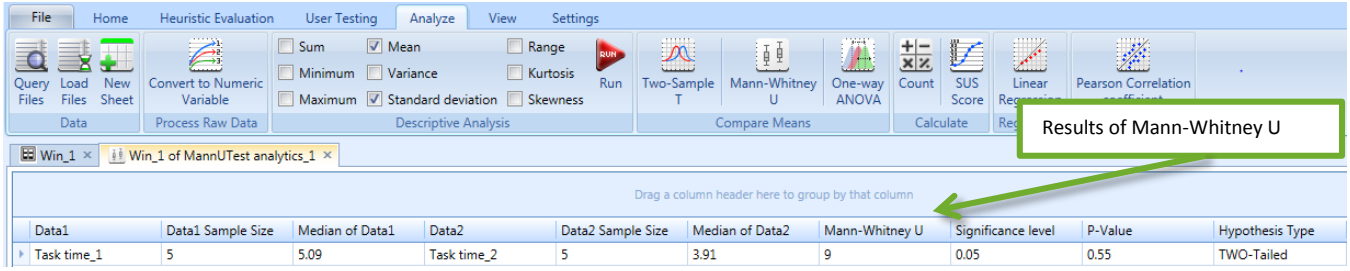

Column Data
Column Name:
Product Name
Data Type:
String
Selected Column Left
Selected Column Right
OK
Cancel
b)-ii Enter Column Name
b)-iii Choose where you want the column to be inserted
b)-iv Click OK



c) Calculate

i) Select **Product Name** and **Task time** Column
ii) Click **Mann-Whitney U** button
iii) Add **Product Name** as **Group Variable**
iv) Choose **EHR 1** for **Group 1,** choose **EHR 2** for **Group 2**
v) Add **Task time** to the **Test Variable(s)** list
vi) Click **OK**





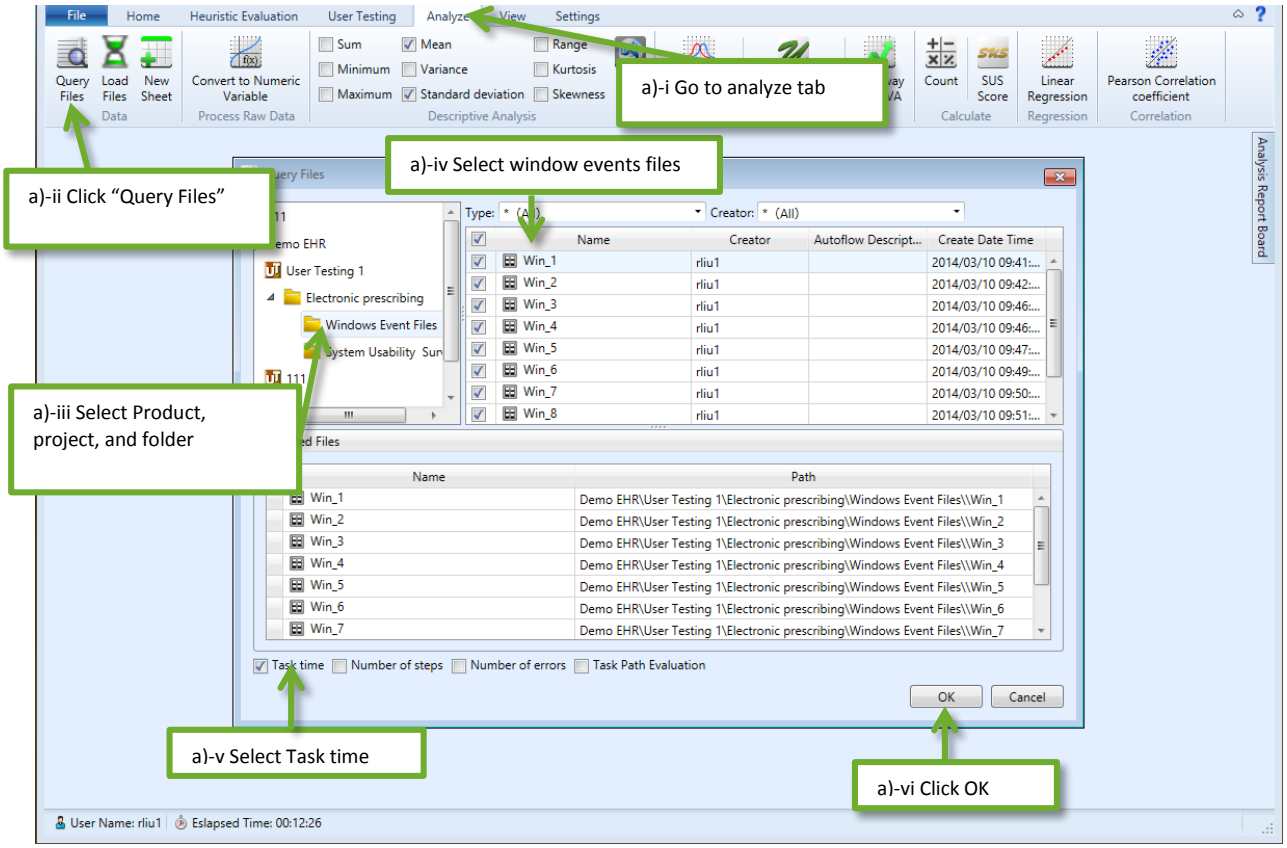
12.3.3 One-way ANOVA test

The one-way ANOVA test is used to compare more than two groups of data. This test shows whether there are any significant differences between the means of three or more groups. For example, a group physicians were asked to do E-prescribing using EHR1, another group of physicians was asked to do the same task using EHR2, and finally the third group was asked to do the same task using EHR3. Now, we are interested to compare the means of task time for E-prescribing based on the data collected from each EHR.

a) Query task time

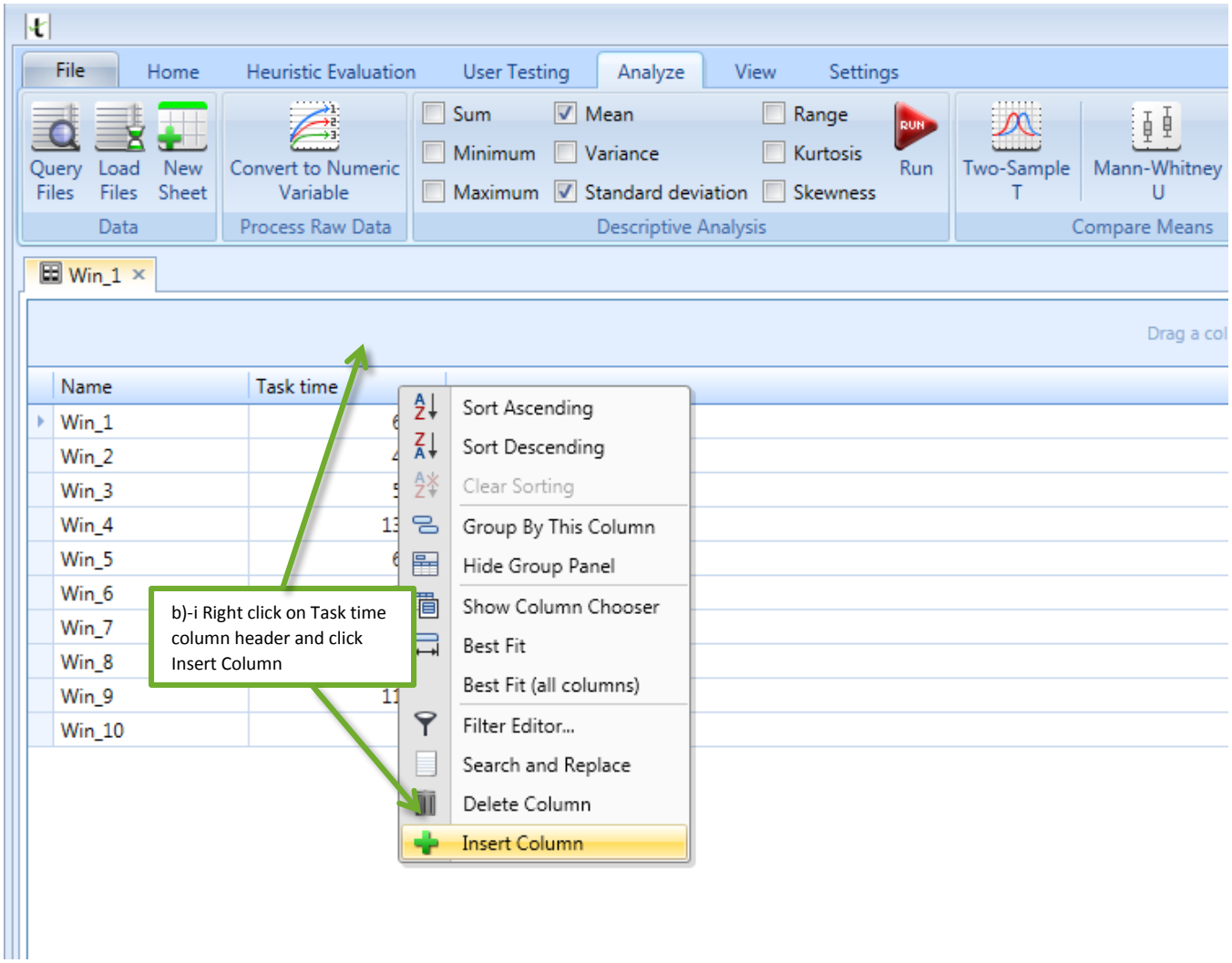
i) Go to Analyze tab
ii) Click **Query Files** button.
iii) Select a product, e.g. **Demo EHR ->** Select a project, e.g. **User Testing 1** -> Select a folder, e.g.: **Electronic prescribing ->**

iv) Select windows event files, e.g.: **Win_1 to Win_10.**
v) Select **Task time**
vi) Click **OK**



b) Add categorical columns

i) Right click on **Task time** and click **Insert Column**
ii) Enter **Column Name**, e.g.: **Product Name.** The data type is preselected on "String". String indicates the data type of the value entered in Column Name. The String data type includes **alphabetic** characters rather than numbers. Also, it allows spaces and numbers.
iii) Choose where you want the column to be inserted, before or after the current column**.**
iv) Choose where you want the column to be inserted, before or after the current column
v) Click **OK**
vi) Enter EHR 1 for the first three rows of Product Name Column to indicate it's Product 1, enter EHR 2 from the fourth to sixth rows of Product Name Column to indicate it's Product 2, enter EHR 3 for the last four rows of Product Name Column to indicate it's Product 3


File
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User Testing
Analyze
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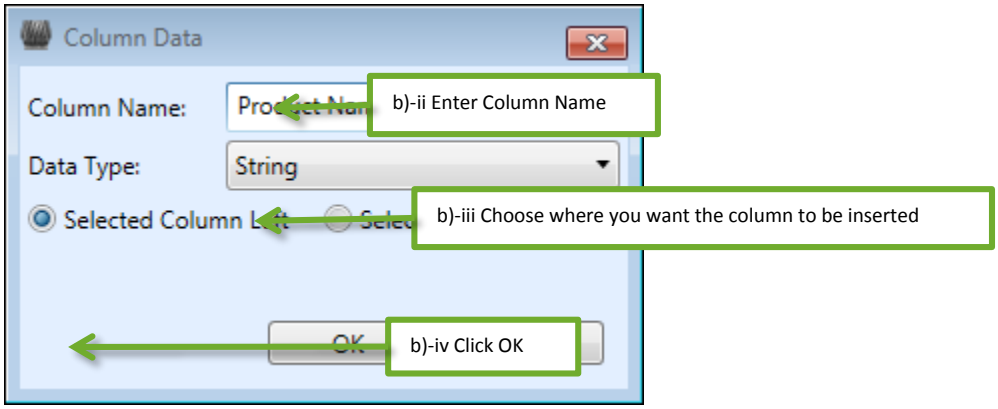
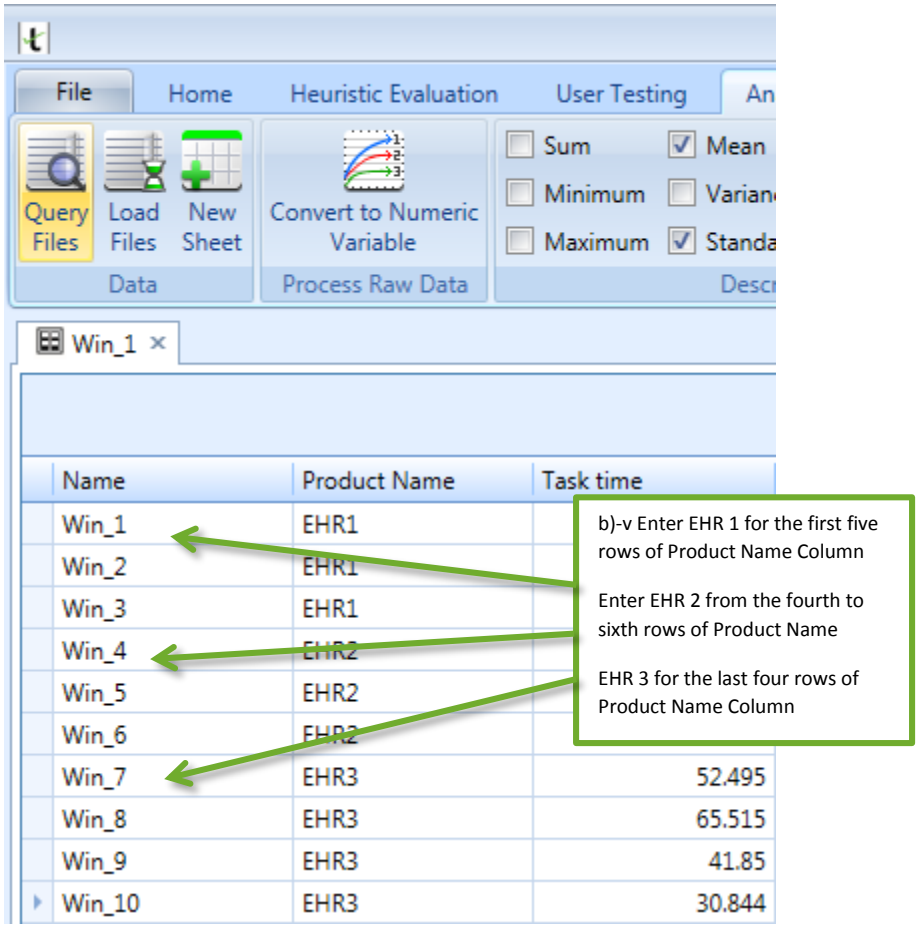
Query Files
Load Files
New Sheet
Data
Convert to Numeric Variable
Process Raw Data
Sum
Mean
Range
Minimum
Variance
Kurtosis
Maximum
Standard deviation
Skewness
Run
Descriptive Analysis
Two-Sample T
Mann-Whitney U
Compare Means
Win_1
Name
Task time
Win_1
Win_2
Win_3
Win_4
Win_5
Win_6
Win_7
Win_8
Win_9
Win_10
Sort Ascending
Sort Descending
Clear Sorting
Group By This Column
Hide Group Panel
Show Column Chooser
Best Fit
Best Fit (all columns)
Filter Editor...
Search and Replace
Delete Column
Insert Column
b)-i Right click on Task time column header and click Insert Column


Column Data
Column Name:
b)-ii Enter Column Name
Data Type:
String
b)-iii Choose where you want the column to be inserted
OK
b)-iv Click OK



c) Choose variables

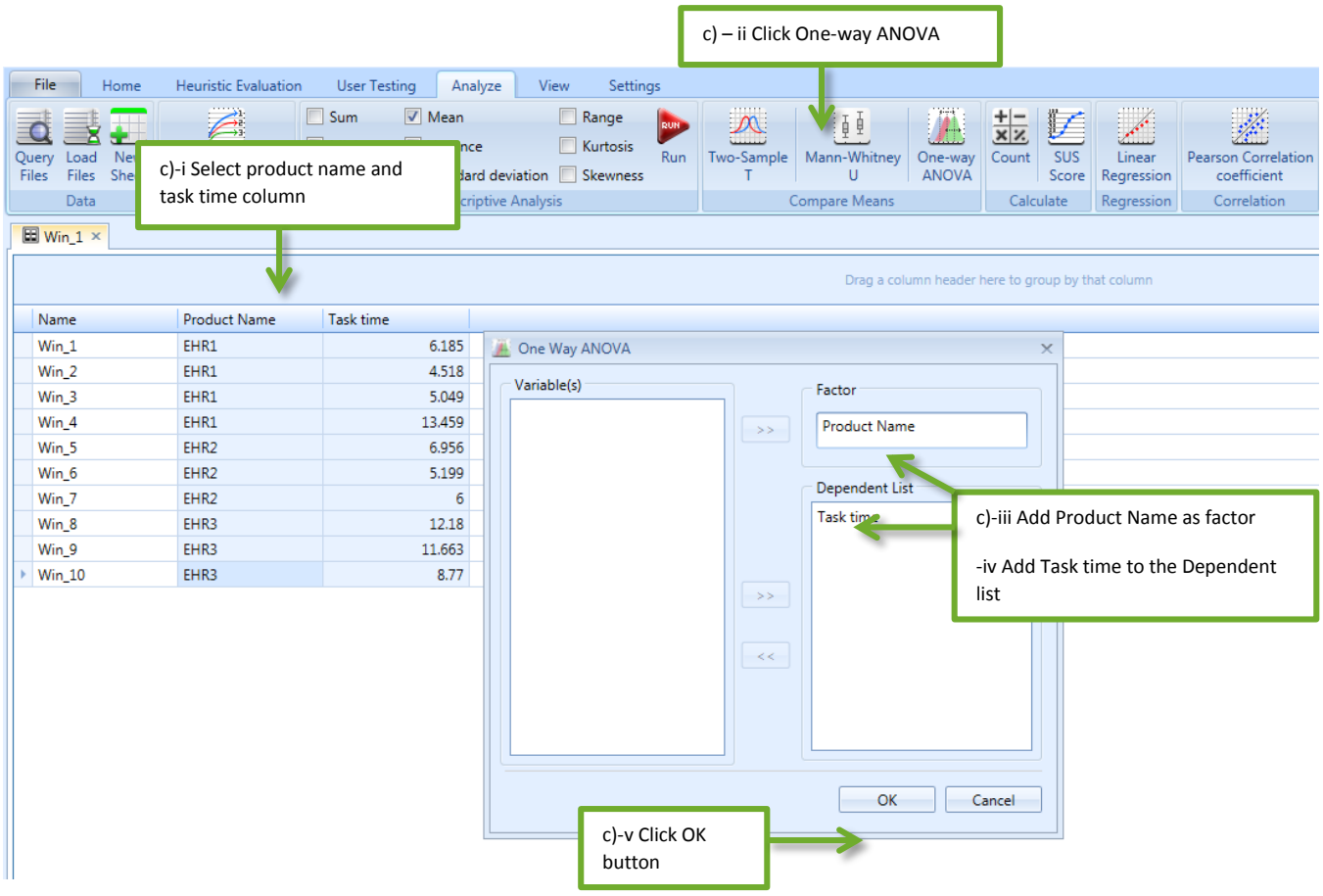
i) Select **Product Name** and **Task time** Column

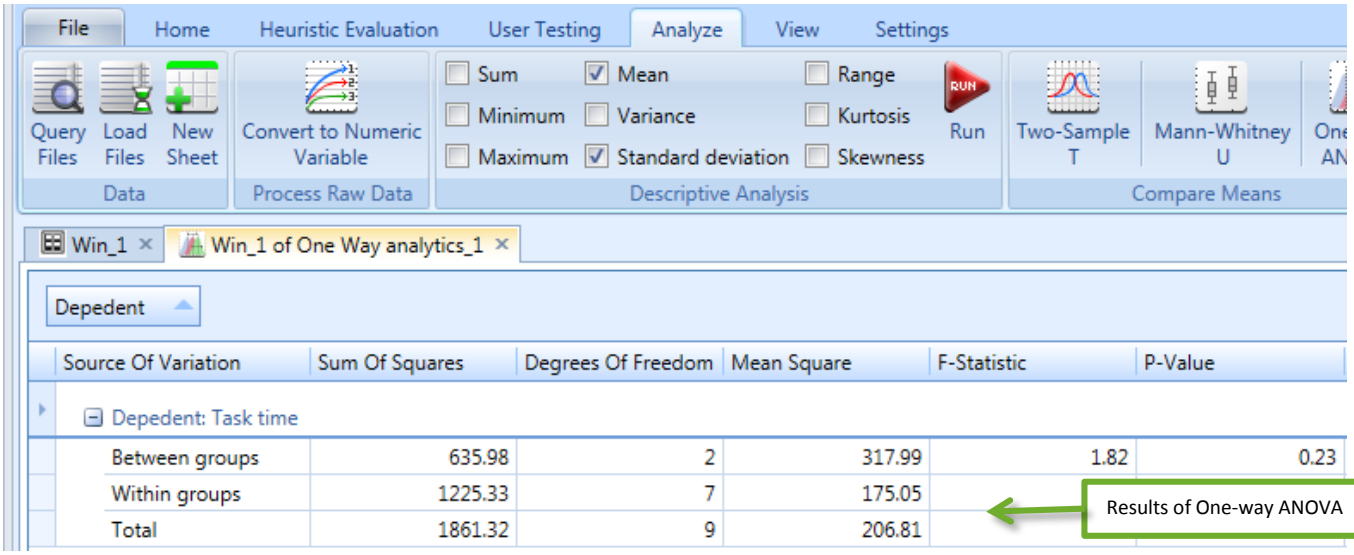
ii) Click **One-way ANOVA** button

iii) Add **Product Name** as **Factor. This step specifies different groups of the test which based on our scenario, are EHR1, EHR2, EHR3.**

iv) Add **Task time** to the **Dependent list. According to our scenario,** it means that three different groups are compared with each other based on the task time criteria.

v) Click **OK**


c) – ii Click One-way ANOVA
c)-i Select product name and task time column
c)-iii Add Product Name as factor
-iv Add Task time to the Dependent list
c)-v Click OK button
One Way ANOVA
Variable(s)
Factor
Product Name
Dependent List
Task time
OK
Cancel


Depedent
Source Of Variation
Sum Of Squares
Degrees Of Freedom
Mean Square
F-Statistic
P-Value
Depedent: Task time
Between groups 635.98 2 317.99 1.82 0.23
Within groups 1225.33 7 175.05
Total 1861.32 9 206.81
Results of One-way ANOVA

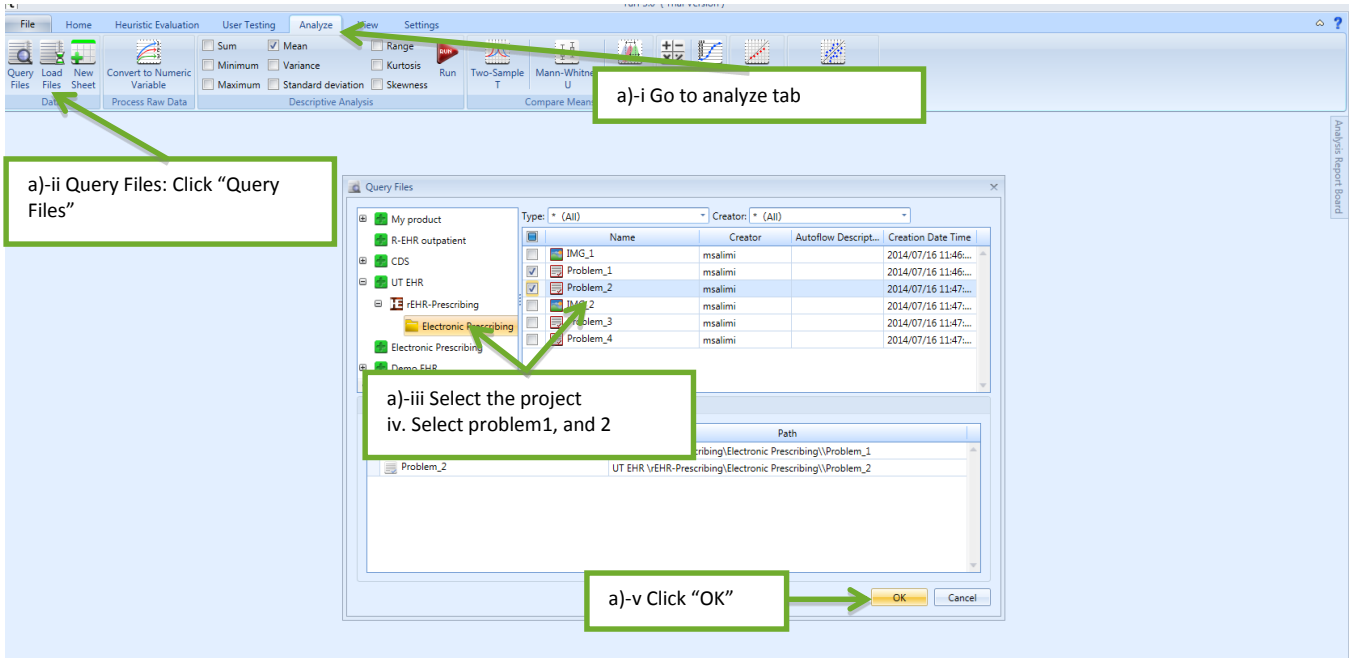
12.4 How to Calculate

12.4.1 Count

In addition to the analytical tests described earlier, you can count the frequencies of each documented design violation by using Count Function in Turf. The count function helps evaluators understand which are the most violations in one project.

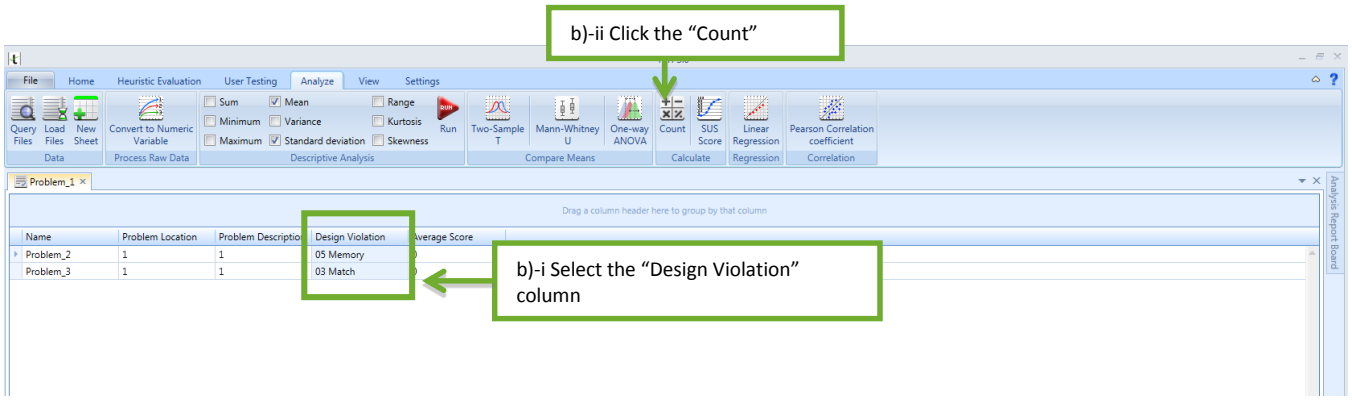
a) Query Files:

i. Go to Analyze tab
ii. Click **Query Files**
iii. Select a product, e.g. **Demo EHR ->** Select a project, e.g. **Heuristic Evaluation 1** -> Select a folder, e.g.: **Electronic prescribing ->**
iv. Select the problems, e.g.: select **Prob_1**, **Prob_2.**
v. Click **OK**

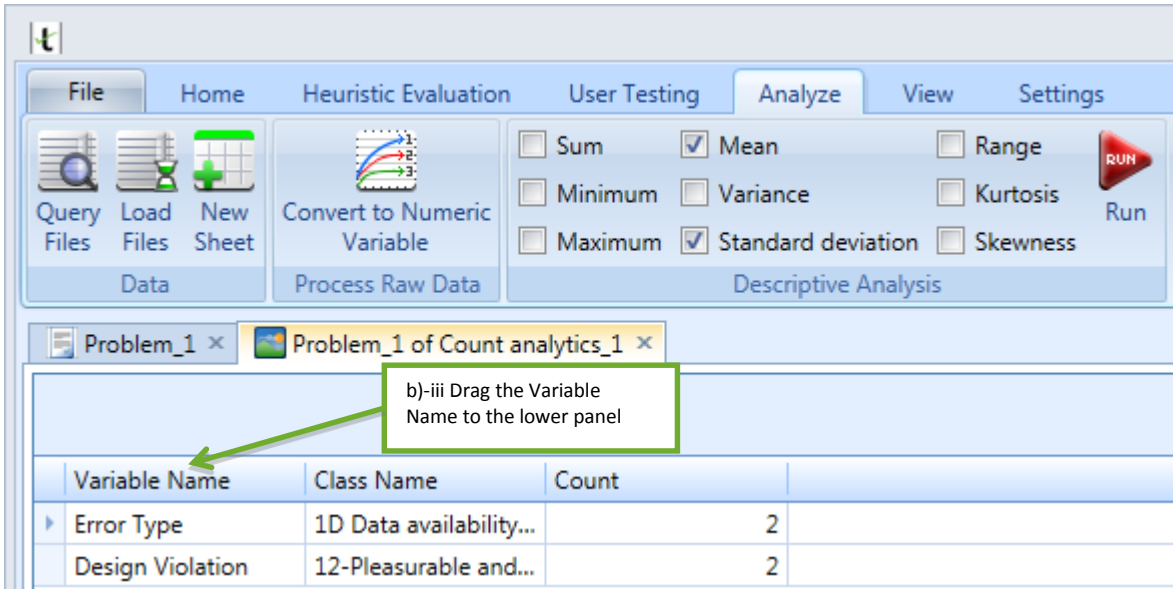


b) **Count:**

i. Select the column **Design Violation** (make sure the selected problems have documented Design Violation)
ii. **Click the Count button**
iii. Drag the **Variable Name** to the lower panel. The result of this step shows based on what criteria the count function was triggered. Performing this step is a simple way to organizing the data displayed on the screen.



You will get the frequencies of each error type and design violation, as appropriate.

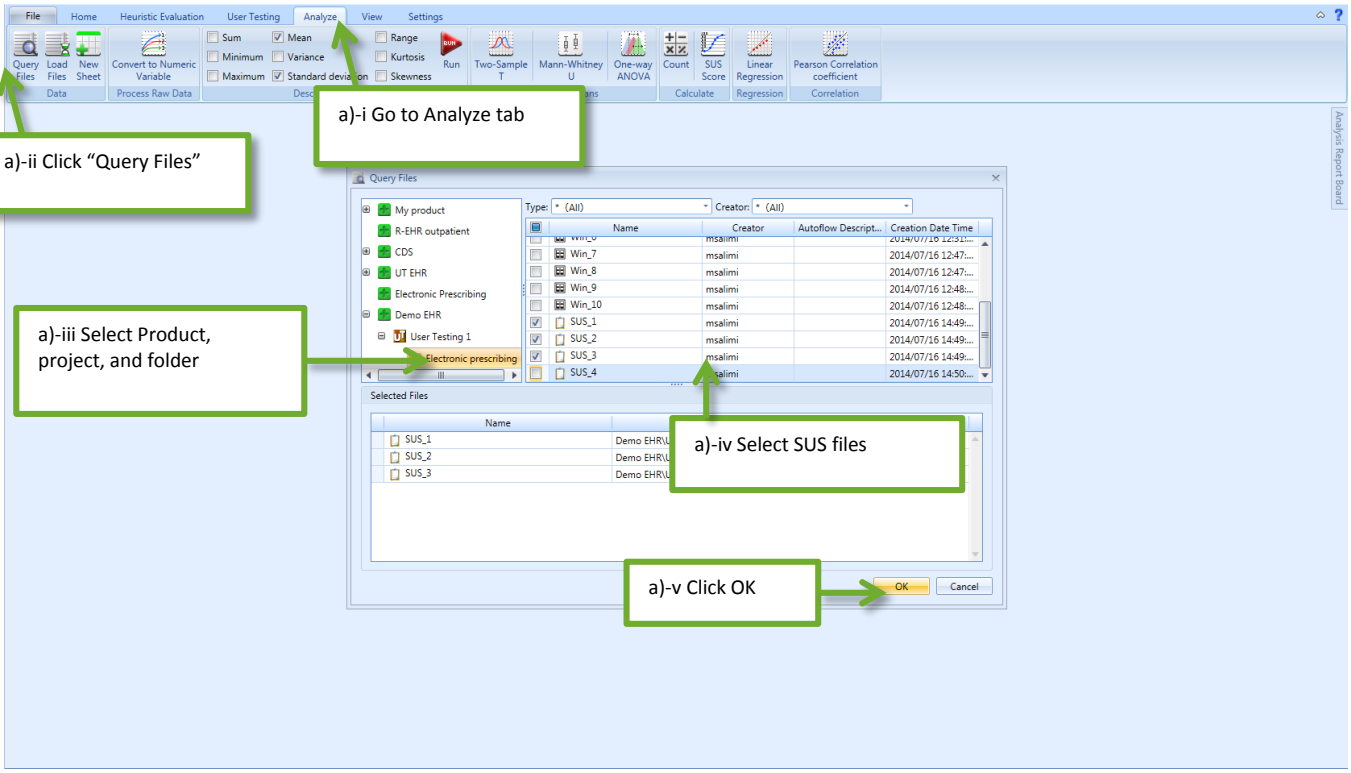


12.4.2 SUS Score

The System Usability Survey (SUS) can be used to quickly test the usability of a product. After collecting the surveys with 10 items from all participants (for more information, please refer to the section 4 of the current document), you can convert the raw scores of each survey into an overall SUS score which ranges from 1 to 100. Then you can use the descriptive analytics in Turf to calculate the average SUS score.

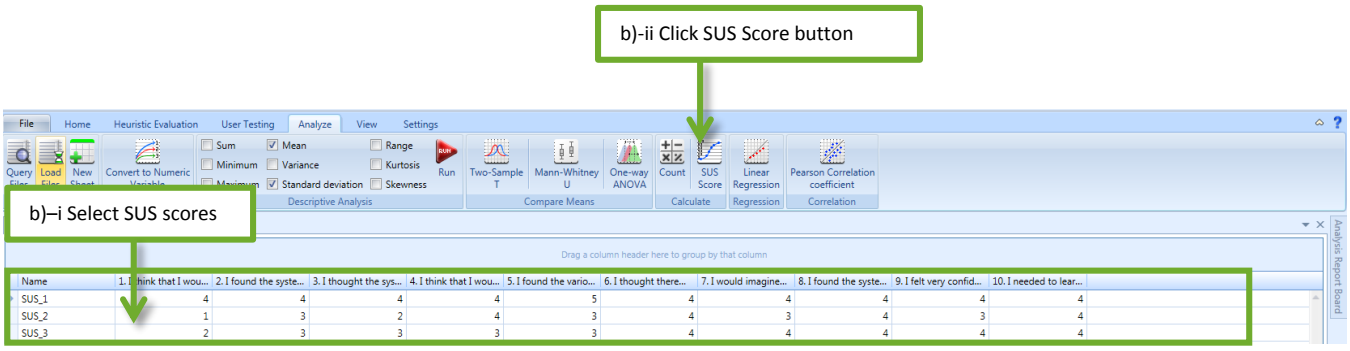
a) Query SUS

i) Go to Analyze tab
ii) Click **Query Files** button
iii) Select a product, e.g. **Demo EHR ->** Select a project, e.g. **User Testing 1** -> Select a folder, e.g.: **Electronic prescribing ->**
iv) Select SUS files, e.g. **SUS_1, SUS_2, and SUS_3.**
v) Click **OK**



b) Calculate overall SUS score

i) Select all the rows (Click on the small arrow next to any of the rows, hold down Ctrl/Shift button, and select other rows).
ii) Click **SUS Score** button

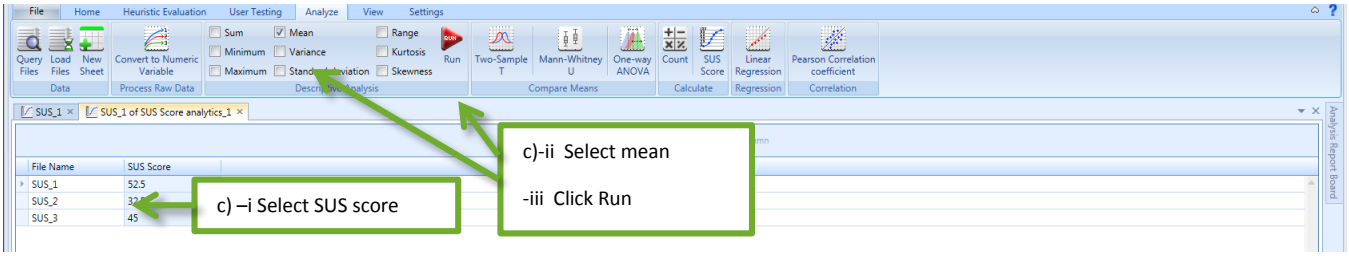


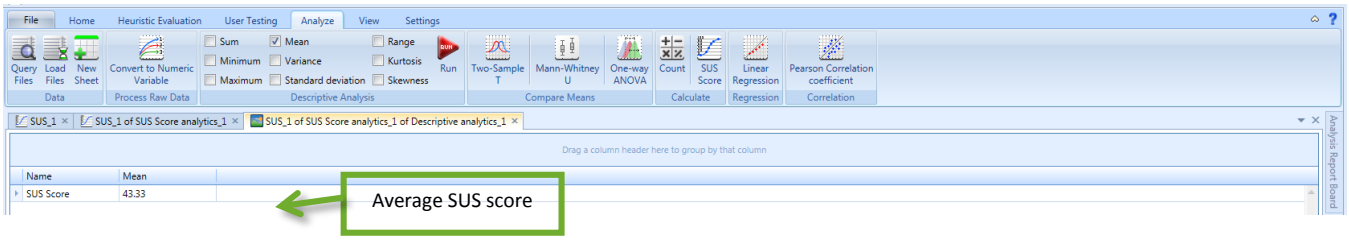
c) Calculate average SUS score

i) Select **SUS Score** column

ii) Select **Mean** by checking the checkbox of mean

iii) Click **Run** button





12.5 How to Do Regression

In statistics, **regression analysis** is a statistical process for estimating the relationships among variables. It includes many techniques for analyzing variables. Here we discuss the most commonly used techniques: “Linear Regression”, and “Pearson Correlation Coefficient”.

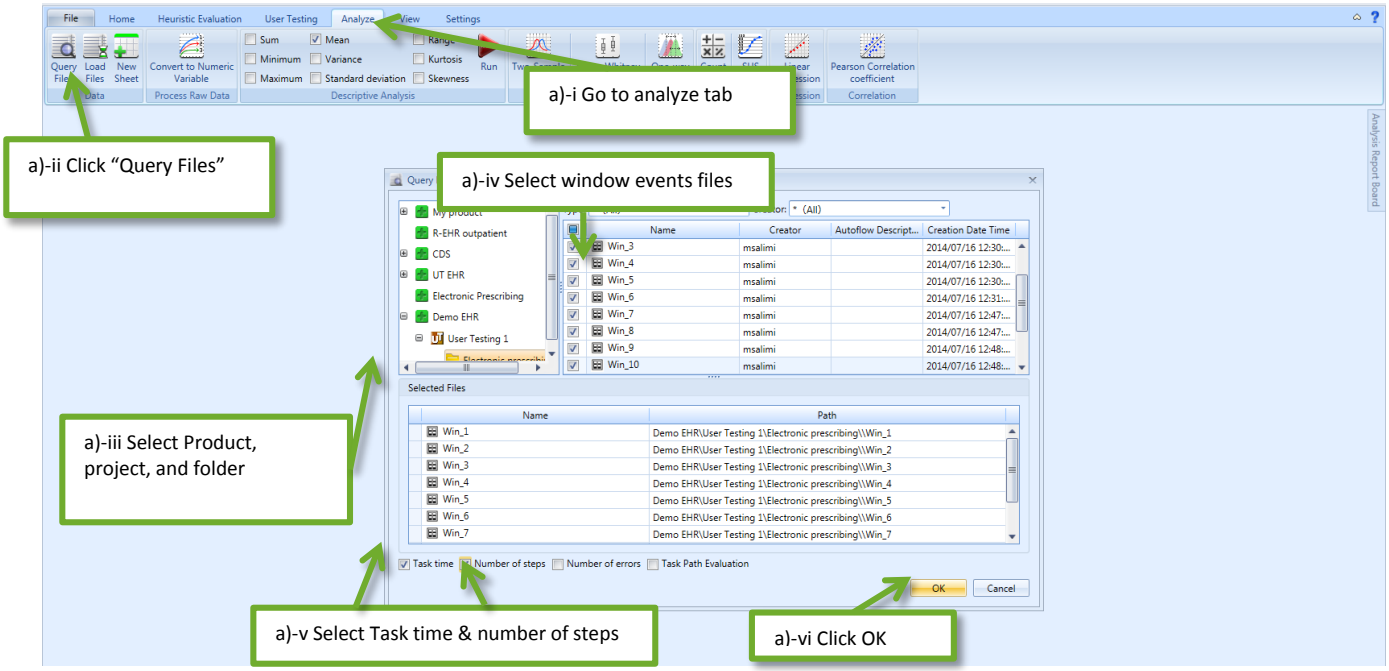
12.5.1 Linear Regression

A linear regression is a statistical model that attempts to show the relationship between two variables with a linear equation. It simply describes how a variable varies based on the change of the other variable. For example, you might be interested to know how the task time of E-prescribing would change based on the decrease or increase in the number of steps taken for E-prescribing.

a) Query task time

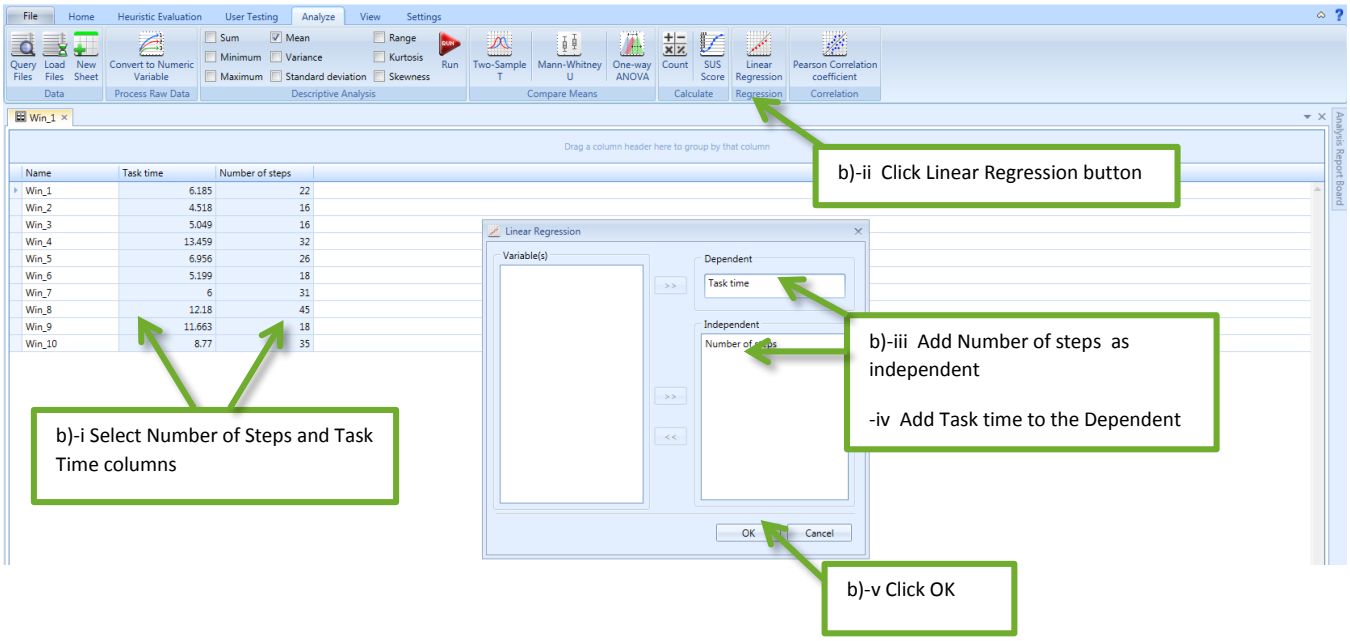
i) Go to Analyze tab

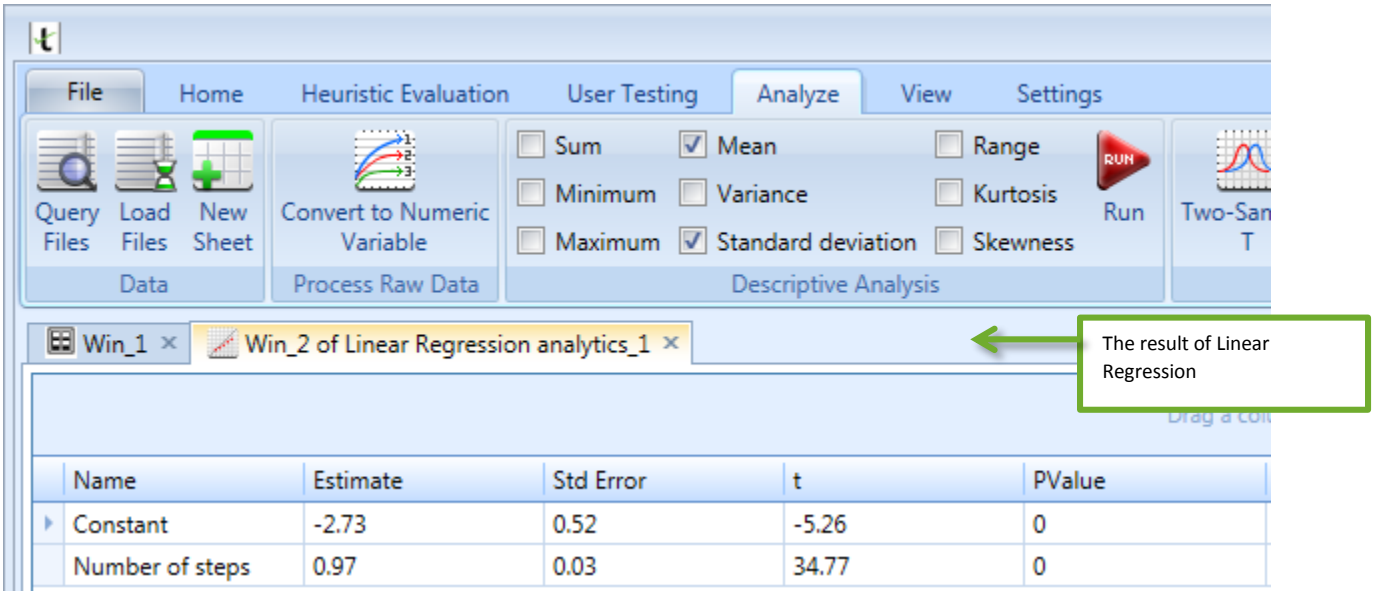
ii) Click **Query Files** button
iii) Select a product, e.g. **Demo EHR ->** Select a project, e.g. **User Testing 1** -> Select a folder, e.g.: **Electronic prescribing ->**
iv) Select windows event files, e.g.: **Win_1 to Win_10.**
v) Choose your desired variables to see the relationship between them. Here, we select **Task time, and Number of steps.**
vi) Click **OK**



b) Choose variables

i) Select **Number of steps** and **Task time** Columns (click on any of these columns, hold down Ctrl/Shift button, click on another column)
ii) Click **Linear Regression** button
iii) Add **Number of Steps** as **Independent**
iv) Add **Task time** to the **Dependent**
v) Click **OK**





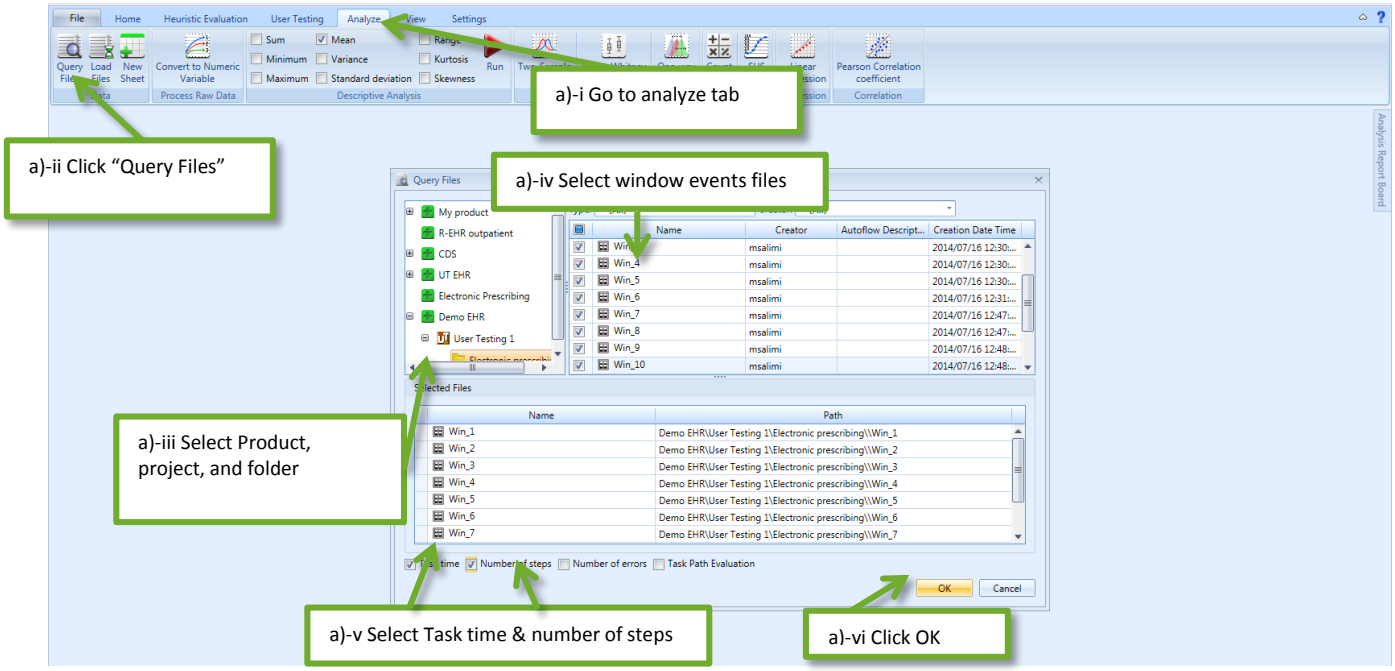
12.6 How to Do Correlation

12.6.1 Pearson Correlation Coefficient

Correlation is a technique for investigating the relationship between two quantitative variables. Pearson's correlation coefficient is a **measure of the strength of the association** between the two variables. It describes how two variables vary together. For example, you might be interested to know whether there is any relation between the number of errors and the number of steps taken for E-prescribing.

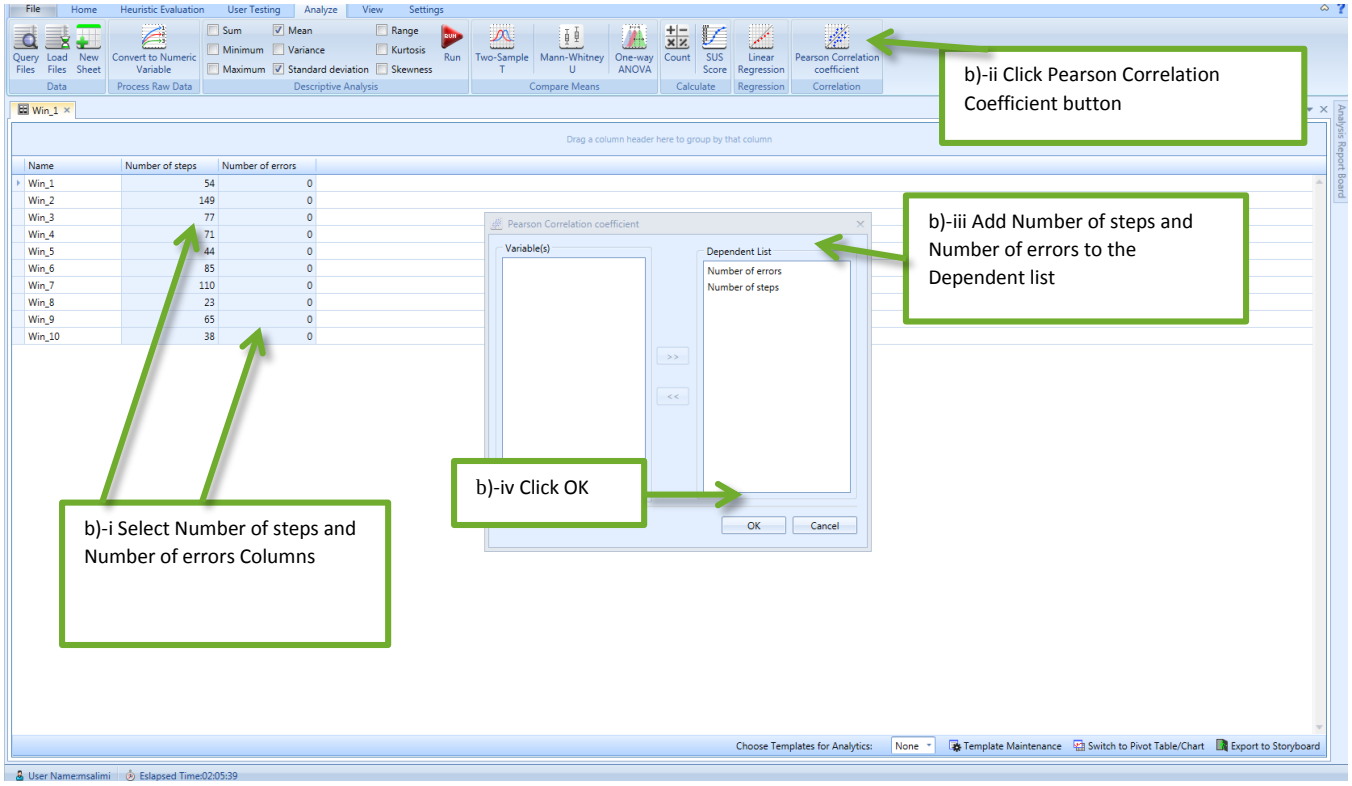
a) Query task time

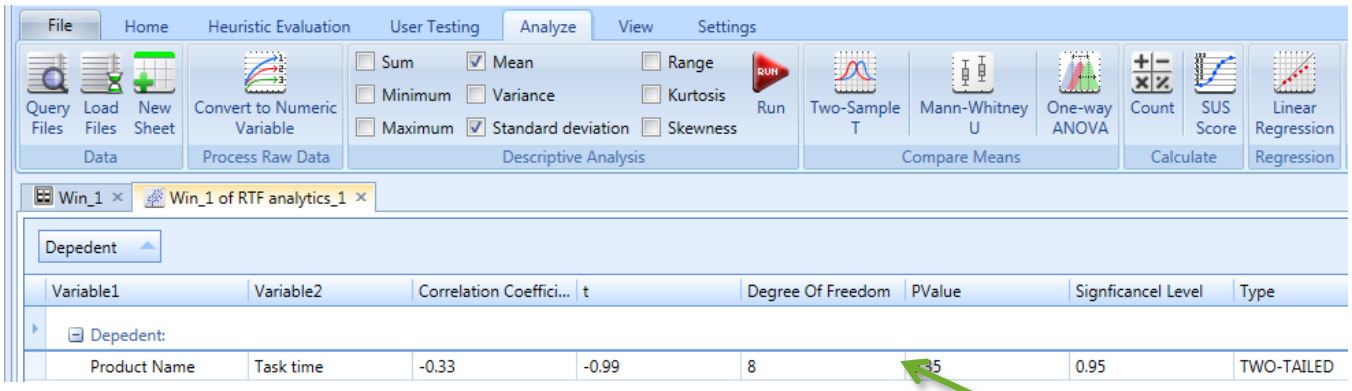
i) Go to Analyze tab
ii) Click **Query Files** button
iii) Select a product, e.g. **Demo EHR ->** Select a project, e.g. **User Testing 1** -> Select a folder, e.g.: **Electronic prescribing ->**
iv) Select windows event files, e.g.: **Win_1 to Win_10.**
v) Select **Task time & Number of steps**
vi) Click **OK**



b) Choose variables

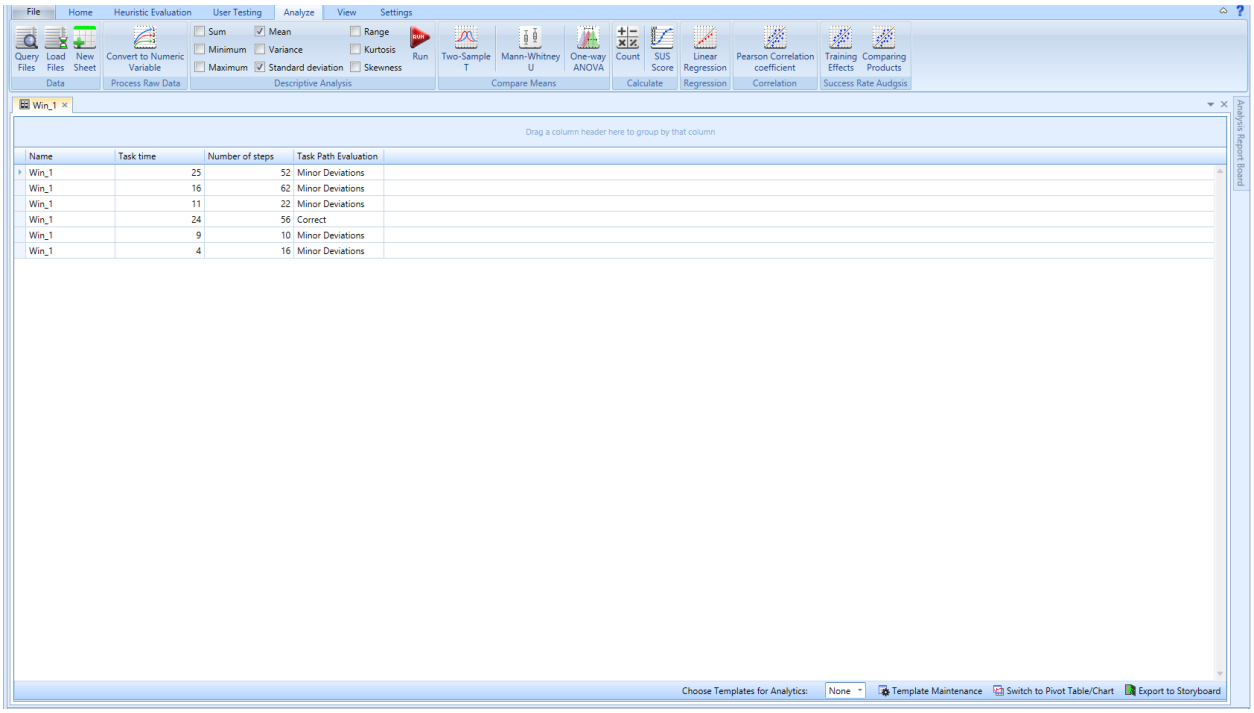
i) Select **Number of steps** and **Number of errors** Columns (click on any of these columns, hold down Ctrl/Shift button, click on another column)
ii) Click **Pearson Correlation Coefficient** button
iii) Add **Number of steps** and **Number of errors** to the **Dependent list**
iv) Click **OK**





13. Pivot table

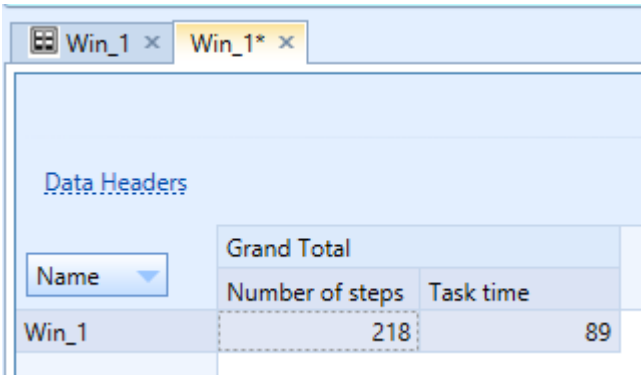
Pivot tables summarize data in an intuitive and quick way. After you have selected the parameters that you want to analyze, click on “Switch to Pivot table/Chart” at the bottom of the screen.



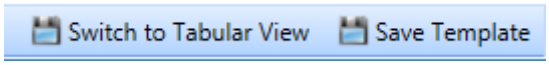
The following screen appears:

If you prefer, you can adjust the columns' widths, so you can see the descriptions. On this screen you will see the aggregated results for each of the field names that you have selected.

Clicking on "Data Headers" will show you the field names. You can drag the field names into the column, or row to design the layout of your pivot table and back to the Data Headers to remove it. You will do this process until you get the desired report. Drag and drop field names on "Drop Row Fields Here" help you summarize results based on that particular field. You can also drop your field names to the "Drop Filter Fields Here" if you do not want to include them in your report.



If you click on “Save Template”, you will be able to save the layout of your pivot table as a template and then apply it to other data files.

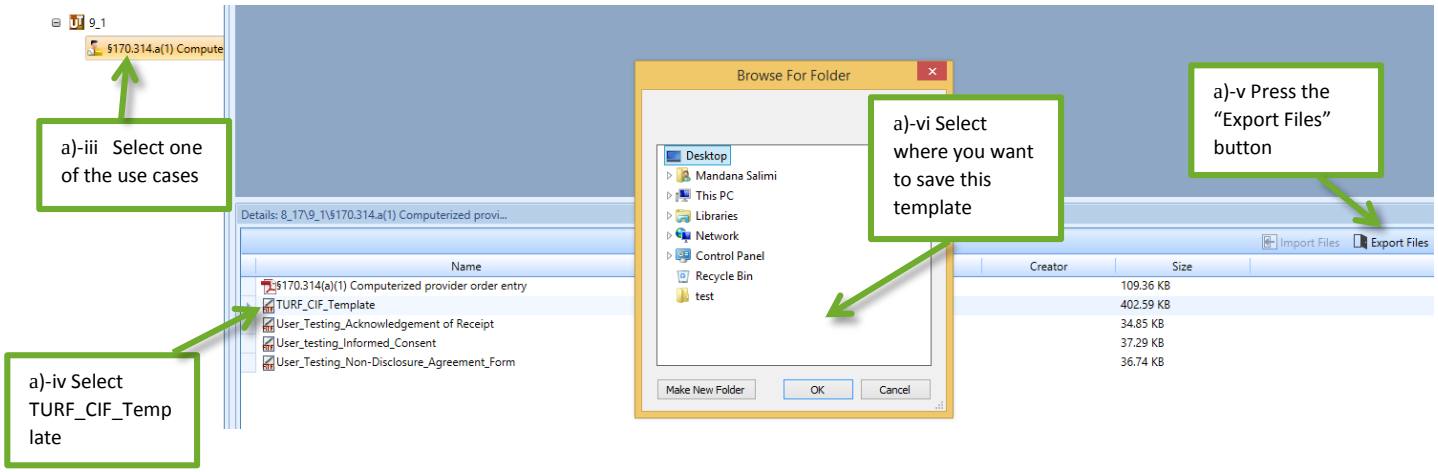


14. Common Industry Format (CIF)

The Common Industry Format (CIF) is a standard format for reporting the results of summative usability testing. In the following we will show how to export the results of Demo files, Win event files, Performance files, and SUS files into the Turf Storyboard (the number of components to be included in the CIF reports varies based on your goal), and how to use the accumulated results in the Storyboard in the CIF template. Before following the steps listed below, make sure you already have created the required files.

a) The following steps demonstrate how to use the CIF template

i. Go to Home, or User testing, or Heuristic Evaluation tab
ii. Under the Projects panel, select a Heuristic Evaluation or User Testing project
iii. Select one of the use cases
iv. Under the details panel on the bottom of the right panel, select the TURF_CIF_Template. Fill in the document, as needed.
v. Press the “Export Files” button
vi. Select where you want to save this template



To gather the results of the files that will be included in the CIF template follow the following steps:

First, we will select the results of the Win files. But before proceeding, make sure you have already defined the number of errors in each windows event file.

b) Follow the following steps to define the potential errors of the windows event files

i. Go to Home, or User testing, or Heuristic Evaluation tab
ii. Select the appropriate folder where you have saved your windows files
iii. Under the Details panel, click on the Win files that you want their results to be included in the CIF report
iv. Once they are opened on the top panel, go to the Error Coding column. For each documented mouse event, define the type of error if applicable.
v. Press the Save button

c) Select the results of the Win files for using in the CIF report

i. Go to Analyze tab
ii. Press the Query Files button
iii. Select your desired Product, and then Project
iv. Select the windows event files that you want to include in the report
v. Select "Number of steps" and "Number of errors"
vi. Press the OK button
vii. Select the entire table by dragging the mouse over it
viii. Click on "Export to Storyboard" button

d) Select the results of the Performance files:

i. Go to Analyze tab
ii. Press the Query Files button
iii. Select your desired Product, and then Project
iv. Select the PFM files that you want to include in the report

v. Press the OK button
vi. Select the entire table by dragging the mouse over it
vii. Click on “Export to Storyboard” button

e) Select the results of the SUS files:

i. Go to Analyze tab
ii. Press the Query Files button
iii. Select your desired Product, and then Project
iv. Select the SUS files that you want to include in the report
v. Press the OK button
vi. Select the entire table by dragging the mouse over it
vii. Click on the SUS Score button (this calculates the individual SUS score for each participant)
viii. Select the SUS Score column
ix. On the “Descriptive Analysis” ribbon, select Mean, Max, and standard deviation
x. Click on the Run button (now you have SUS Score for all of the individuals that have completed your survey)
xi. Select the entire table by dragging the mouse over it
xii. Click on “Export to Storyboard” button

f) Exporting the file from the Storyboard

Now that you have the results of all components copied to the Storyboard,

i. Go to the Storyboard
ii. Click on the Export Document button
iii. Select the RTF file as the export format
iv. Press the OK button
v. Select the location where you want to save it
vi. Press Save button

g) Importing the exported data to the CIF template

i. Open the file containing the data copied to the Storyboard
ii. Select all data by pressing Ctrl+A keys
iii. Use Ctrl+C keys to copy data
iv. Open the CIF template
v. Scroll to the bottom of the document where the Appendix is
vi. Under this heading, paste your data
vii. Save your file

15. Settings Procedures

15.1 How to Do System Configuration

15.1.1 Use Cases

The **Use Cases** button opens a mini tab that allows the user to create, modify or upload a new use case. **New Use Case** opens a window popup where users can enter the name and the description for a new use case they create. **New Folder** opens a window popup where users can name a folder and description to keep new, old and updated cases organized. **Modify** allows users to rename a folder/ use case. **Delete** permanently deletes the selected folder/use case. Clicking **Load** allows the user to find an XML file from the computer to upload to Turf. Clicking on **Upload** opens a popup window where users can upload a PDF/RTF file by selecting the path and creating a brief description. Clicking **Export** allows the user to save a use case file in XML format to a folder chosen by the user.

15.1.2 Descriptive Template

The **Descriptive Template** button opens a mini tab that allows the user to create, modify or upload a new template. These templates can be used as Evaluation Templates for a Heuristic Evaluation Project. **New** opens a new template mini tab where the user can create a template from scratch, selecting the name, dimensions, description, etc. **Load** opens a window where the user can upload an XML format of a new template from the computer. **Export** allows the user to save the template in XML format to a folder chosen by the user. **Delete** permanently removes the template selected. Clicking on any of the 5 default templates opens the template in another mini tab to allow template editing.

15.1.3 Widget Definitions

Widget Definitions opens a mini tab where users can assign different icons, such as, Button, **TextBox, List Box, Check Box** or **ComboBox** to problems found in the images captured from different resources, such as, a HTML page, an Android device, an IOS device, or a windows screenshots.

15.1.4 Color Definitions

Color Definitions opens a mini tab that allows the user to set the unique color for **Windows events color** and **Mark property color** from a dropdown list of a **Color Category**. Users can **Add Field** or edit an existing field by customizing the **Name**, **Color** used, **Description** of the field and **Active** checkbox.

15.1.5 Hot Key

Hot keys can be customized for each of the 6 tabs. Hot keys can easily be modified by clicking on the **ActionName** of the hotkey, then clicking on the **Modify Hotkey Value,** and choosing a unique hotkey value in a **Set Hotkey** popup. The user can customize the **Hotkey** keystrokes if the hot keys are **Active**.

15.1.6 Video Settings

The **Video** settings allow users to specify the maximum number of video tabs that can be opened at the same time.

15.1.7 OneDrive Settings

OneDrive settings allow you to customize the way that you want Turf interact with your OneDrive account.

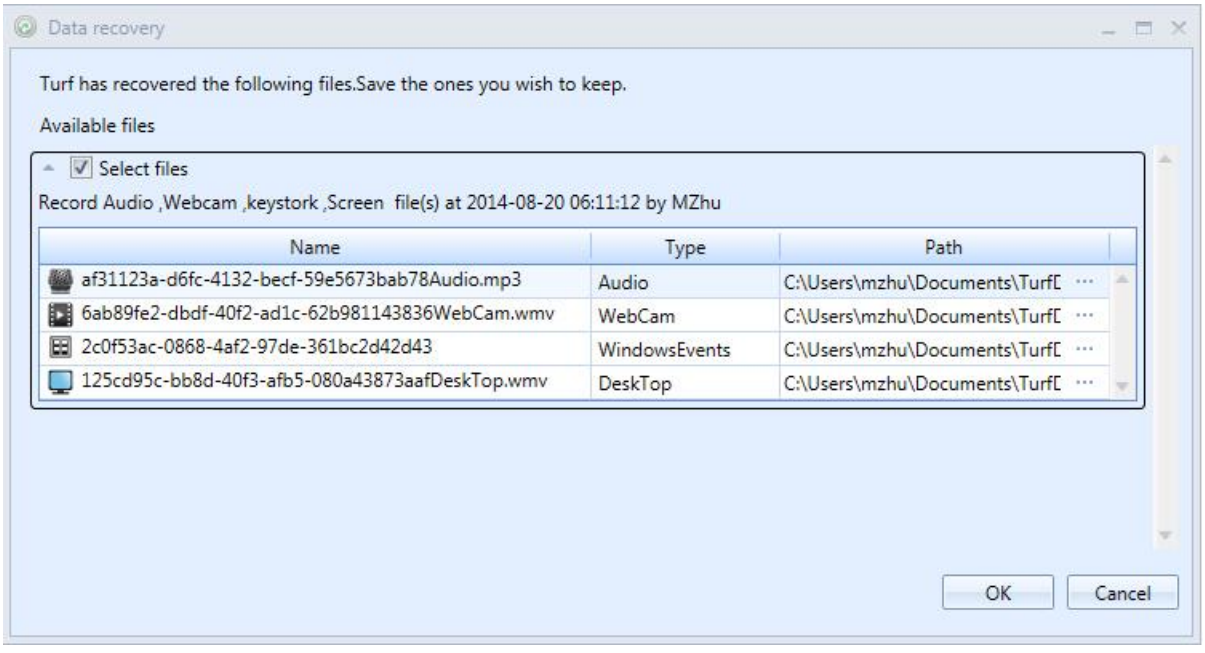
15.1.8 Install Turf for Android Settings

Install Turf for Android settings allow you to install Turf on your android smartphone or tablet device.

16. Troubleshooting

16.1 Recover Interrupted Files

A one-of-a-kind characteristic that Turf has is its ability to restore interrupted media files. If there is any interruption in recording media files, launching turf will open a pop up window prompting you to save the corrupted file. Clicking on the OK button will restore the corrupted files and you will not lose any data.



17. Recommendations

17.1 Labeling Files

Turf assigns a label to each file based on the system default settings. It is recommended to rename the files in a way that makes sense for you. For example, if you have different notes in a folder, it is recommended to organize them in a systematic way. Labeling each note with its corresponding media file might be a good idea.

18. Update Instructions

Please follow the instructions below to update the earlier versions of Turf to the latest one (4.0):

i. Uninstall the current version: control panel >> programs >> uninstall a program >> select Turf >> uninstall
ii. If you have data from Turf old versions (Truf 3.0.1 and higher) and you want to access them in new version:
    a. Make a backup of current TurfData located in C:\Users\<user name>\Documents\TurfData3.0
    b. Rename the folder from TurfData3.0 to TurfData4.0
    c. The files can be accessed in Turf4.0, however, the Heat Map function will not work on the keystroke events recorded in earlier versions.
iii. Install the new version: For the instructions on how to install Turf, please click here.
iv. Launch new version – Turf 4.0
v. Your activation key used for Turf 3.0.1 will not work and will need new activation licence.