# IMPROVISE
## BUILD•BROWSE•BEHOLD

### *What is Improvise?*

Like spreadsheets created in Microsoft Excel, each example visualization is not a piece of standalone software, but rather one particular document created in a general-purpose desktop application program called *Improvise*. Improvise is an information visualization builder and browser that has been used to create numerous visualizations of diverse data sets. More information on Improvise can be found on the web at

http://www.cs.ou.edu/~weaver/improvise/

### *Installing Java*

Improvise runs as a cross-platform Java program rather than as a platform-specific binary executable program. The included version of Improvise requires Java 8 to run. If you need to install Java on your system, I recommend using Oracle's distribution of Java SE 8—currently version 8u241 as of March 30, 2020—located at
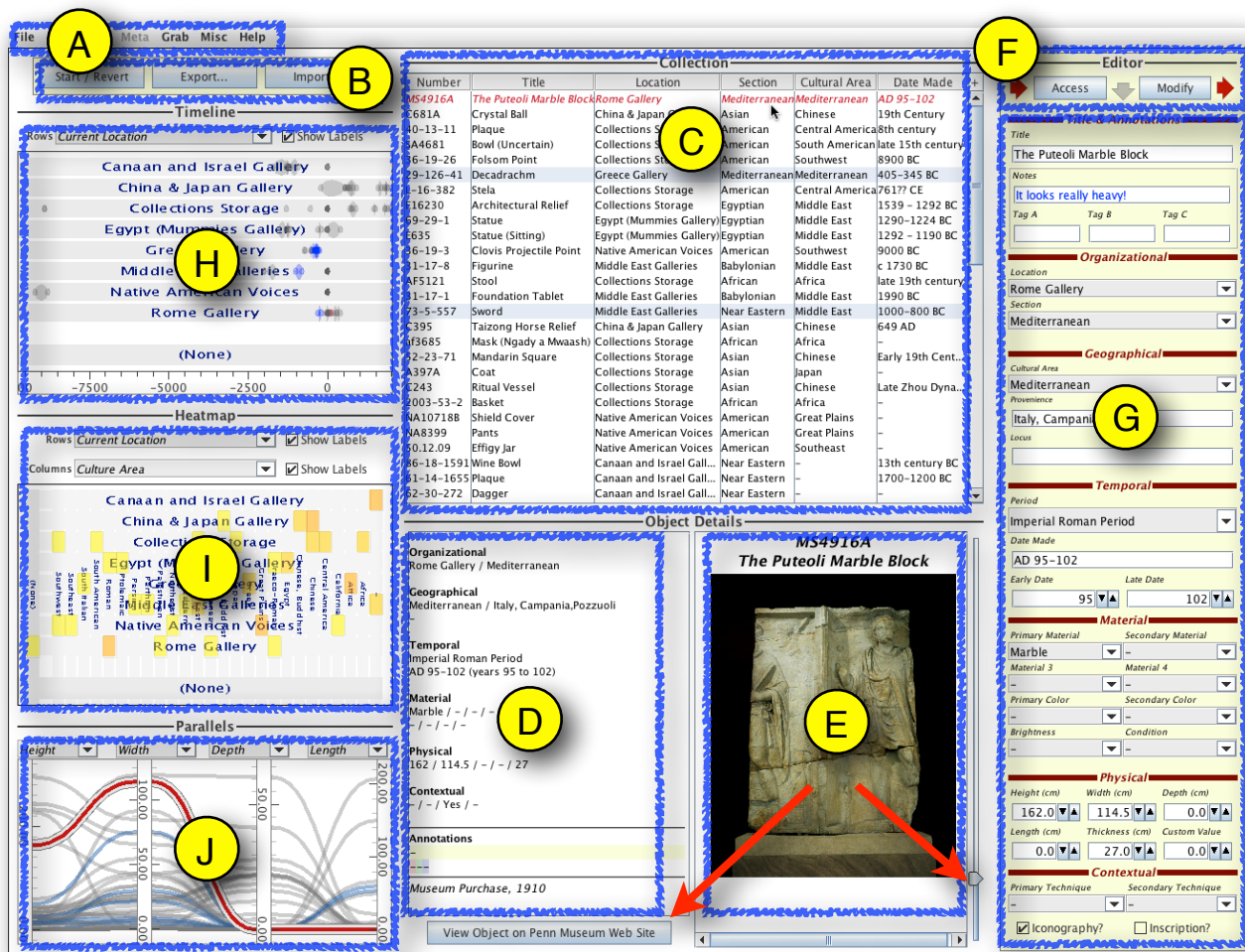
https://www.oracle.com/technetwork/java/javase/downloads/index.html

### *Launching Improvise*

On most systems, you can simply double-click the `improvise.jar` file to run Improvise. A splash screen will appear, followed by an empty visualization window.

### *Loading the Visualization*

The `visualization` folder contains the `collection.viz` file and a `data` folder. To load the visualization, choose the `File/Open...` menu item in the menu bar of any open visualization window. A file chooser will appear. Navigate to the `visualization` folder and select `collection.viz`. The visualization will appear in a new window shortly.

The window requires a screen resolution of at least 1332x1044 to show everything in the visualization at once. If the window is smaller than that, due to preference or screen limits, use the scrollbars along the window's edges to move around the visualization.

***Touring the Layout***

The visualization is designed for browsing and editing the metadata of physical objects in a museum collection. The data has 30 metadata attributes describing a wide variety of organizational, geographical, temporal, material, physical, and contextual dimensions of information. A photograph of each object is also included. All data and images come from the University of Pennsylvania Museum of Archaeology and Anthropology.

The layout of visualization consists of ten major areas:

A. A **menu bar** for accessing a variety of Improvise features. The `File` menu contains the usual `Quit` menu item. In the `Grab` menu, use the first `Capture PNG` menu item to take a screenshot of the visualization (or use your system's screen capture utility). *All other menu features are for <u>building</u> visualizations, which you won't be doing!*

B. **Buttons** for exporting, importing, and loading/restoring collection metadata. Click the `Start/Revert` button to load/restore the original, provided metadata. *This should be your first step whenever you (re)open the visualization.* Click the `Export...` button to save a copy of the metadata, including your edits, as a comma-separated values (CSV) file. Click the `Import...` button to load a previously saved metadata file.

C. A **table view** listing prominent metadata attributes for objects in the collection. At any given time only one object can be selected in the table. It is highlighted in red. *You can click in column headers to sort the objects on their displayed attributes.*

D. A **text view** showing additional information about the currently selected item. Most of its metadata attributes are displayed. A dash ('-') indicates a metadata attribute that does not have a data value assigned to it.

E. An **image view** showing a zoomable photograph of the object beneath its reference number and title. Use the slider on the right of the image to zoom. Click the button to the left of the image to view information about the object on the museum web site.

F. **Buttons** for accessing and modifying the metadata of the currently selected object. To edit an object, first click the Access button to load its metadata into the editor pane. Second, use the various editing controls to enter any desired changes to its metadata values. Third, click the Modify button to actually update the metadata for the object. Updates to metadata will be reflected throughout the visualization.

G. An **editor** for manipulating metadata attributes. There are controls for most attributes. The type of control corresponds to the metadata type: popup menus for categories, text fields for names/labels, spinners for numbers, and checkboxes for boolean attributes. There are also several text fields for annotation and custom tagging.

H. A **timeline view** of the collection. Objects are grouped into rows based on the categories of metadata attribute selected in the nearby popup menu. Time (in years) can be panned by *dragging*, or zoomed by *shift-dragging*, in either the timeline or the axis below it. Use the checkbox to show or hide row labels. Each object appears as a oval spanning the object's early date to its late date, with smaller ovals marking those end points. *Click* objects to highlight them in blue; *shift-click* highlights more. *Click* in the background to clear the highlighting. Highlighted objects are also highlighted in blue in the table (C) and parallels visualization (J). *You can use the timeline view to compare the ages of objects and see how uncertain those ages are (the oval width).*

I. A **heatmap view** of the collection. Objects are grouped into rows and columns based on two metadata attributes selected in the nearby popup menus. Each cell of the grid uses color to represent the number of objects in a given pair of metadata categories. For instance, the yellow cell at top left indicates that there is a single object with a *Current Location* of 'Collections Storage' and a *Culture Area* of 'Southwest'. Darker shades of yellow, orange, and red indicate progressively larger ranges of counts for various pairings of *Current Location* and *Culture Area*. Use the checkboxes to toggle row and column labeling. When both are off, cells also display exact counts. *You can use the heatmap view to see hot and cold spots in the collection and its attributes.*

J. A **parallels view** of the collection. Each object appears as a curve that connects four of its numerical attributes. For instance, the curve for the currently selected object links a medium weight to a large height to zero depth and length values. Use the four popup menus to choose desired attributes. Objects can be highlighted by clicking just like in the timeline view. Each axis (independently) can be panned and zoomed just like in the timeline view.*You can use the parallels view to compare measurements for a single object, between multiple objects, or across patterns in the whole collection.*

**Warning!** To avoid undesired data loss, the editor does not automatically track selection of objects in the table view. The editor will always apply to the object that was selected when the `Access` button was most recently clicked. If you click the `Modify` button, edits will apply to that object. It may not be the one currently selected in the table. *Remember to follow the Access-Edit-Modify steps described in (F) above!*

**Warning!** The text fields in the editor do not apply changes automatically when you exit them. Typed text appears in blue to show that changes are in progress. To finalize your changes, hit return while still in the text field. The text will change to black to show that the changes have been applied. *(Why this unusual design? Improvise visualizations can be very dynamic. Recomputing after every keypress is often expensive and unneeded.)*

How you move between and interact with the various areas of the visualization is largely up to you. Be encouraged to explore and try things. As you work, please keep in mind that Improvise is lab-grown software. If you encounter any bugs, try restarting Improvise and reload the visualization. Your instructor can contact me if more serious issues arise.

### *Editing the Metadata*

In this exercise, you will gain experience using a variety of the visualization's features to edit the metadata of objects in the collection. Some tasks will involve making prescribed edits. Others will involve recording your own observations and interpretations of objects, as seen in photographs. The tasks within each set can be done in any order; however, all tasks in the prescribed set should be completed before doing any of the observation/ interpretation tasks. Start fresh by clicking `Revert`. The prescribed tasks are as follows:

1. *Correct.* Find the <u>oldest</u> object in the collection. Correct its `Date Made` attribute to better reflect the values of its `Early Date` and `Late Date` attributes.

2. *Format.* Capitalize "Century" in the `Date Made` attribute of all pertinent objects. (Hint: You may need to look closer somehow to spot them all!)

3. *Update.* Eleven objects are in the `Asian` `Section`. Update the `Location` of those in `Collections Storage` to `China & Japan Gallery` to reflect recent gallery updates.

4. *Adjust.* One of the `Condition` categories is represented by only one object. Find the object and adjust its `Condition` to `Good`. (Hint: Use the heatmap to identify a specific `Location` or `Section` that *must* contain that object, then narrow down your search to within that `Location` or `Section`.)

5. *Switch.* Modify the two `Statues` in the `Egypt (Mummies Gallery)` `Location` to <u>both</u> use <u>either</u> `Depth` or `Length` attribute to record the front-to-back distance of the object.

6. *Extend.* Find the <u>highest</u> object in the collection, then edit it to add `Pigment` as its `Secondary Material`, `Grey` as its `Primary Color`, and `Damaged` as its `Condition`.

After performing tasks 1–6, take a screenshot of the visualization (from the Grab menu) and save it as tasks1.png. Export your edited data as data1.csv (remembering to select CSV as the format on the right side of the file chooser).

The observation and interpretation tasks are as follows:

7. Examine the photograph of object Number 91-26-158. Judging from the values of Height and Width already recorded in the data, estimate values for a suitable combination of the other physical dimensions, and edit the object correspondingly.

8. Examine the two Statues in the Egyptian Section. Edit each of them to record your impressions of the eight Material and four Contextual attributes.

9. Examine the photograph of object with the Title Coat. Edit any or all of its attributes to reflect your own observations and interpretations.

10. Browse the photographs of the collection. Modify the Locations of objects to put the ones you would like to see together into My Ideal Gallery.

11. For the objects in My Ideal Gallery, enter values for Tag A to group them into a reasonable scheme. Add a brief annotation to a few of them to convey how they interest you. (Set up the heatmap to show how your gallery is grouped by tag values when you take your second screenshot.)

12. Find a new, obvious data entry or formatting error in the metadata, and correct it. (Select the object and access it the editor when you take your second screenshot.)

After performing tasks 7–12, take a screenshot of the visualization and save it as tasks2.png. Export your edited data as data2.csv. Take into account your general approach and the specific interactions you performed to accomplish each task when you evaluate your experience in Part II. Also describe the error you found for task 12.