

CSE 219, Stony Brook University

# Software Requirements Specification

for CIA Factbook Mapper Application

Dinia Grace Gepte  
3/29/2011

## Table of Contents

<b>1. Introduction .....</b>	<b>1</b>
1.1. Purpose .....	1
1.2. Scope .....	1
1.3. Definitions, acronyms, and abbreviations.....	1
1.4. References.....	1
1.5. Overview .....	1
<b>2. Overall description.....</b>	<b>2</b>
2.1. Product perspective .....	2
2.1.1. User interfaces.....	2
2.1.2. Hardware interfaces.....	4
2.1.3. Software interfaces .....	5
2.1.4. Operations .....	5
2.2. Product functions.....	8
2.3. User characteristics.....	8
<b>3. Specific requirements .....</b>	<b>8</b>
3.1. External interface requirements.....	8
3.1.1. User interfaces.....	8
3.2. Functional requirements.....	14
3.3. Performance requirements .....	15
<b>APPENDIX .....</b>	<b>16</b>
A.1 GUI components hierarchy .....	16

## List of Figures

Figure 1. Table tab view .....	2
Figure 2. Map tab view .....	3
Figure 3. Map Title dialog .....	3
Figure 4. Map Color dialog.....	3
Figure 5. Country Flags dialog .....	4
Figure 6. Country Names dialog .....	4
Figure 7. Field Description dialog .....	4
Figure 8. Help dialog.....	4
Figure 9. General Case: Open to publish a map .....	5
Figure 10. Add and customize map title .....	5
Figure 11. Choose a field to color the map .....	6
Figure 12. Create a new field and formula .....	6
Figure 13. Choose a preferred color map gradient .....	6
Figure 14. Display and customize country names .....	6
Figure 15. Display and customize field description .....	7
Figure 16. Display and customize flags.....	7
Figure 17. Return to default map .....	7
Figure 18. Sort table .....	7

## 1. Introduction

### 1.1. Purpose

This document aims to describe a Java IDE application for displaying and generating maps. It provides a list of necessary software requirements and specification that will be useful for software developers and end-users.

### 1.2. Scope

The application named CIA Factbook Mapper will display world data facts and figures in graphic and tabular formats. Graphically, the program will render a world map on the viewport in colors that are modifiable by the user to represent specific world statistical data. It will also provide functions that will affect what is shown on the viewport such as: easily customizable map title, country names, country flags, and field description, as well as a mouse-dependent rendering of a country's information. In addition, the user will be able to navigate and zoom in and out of the map. The tabular view will offer the user the data behind the color-generation of each section of the map as well as a function to sort the data. The program will not accept user-changes to the table, however.

Eventually, the user can opt to save the map for future reference and/or have the program generate an image of it. This will offer a user-friendly approach to display world statistics for easy viewing and understanding that can be used for creating reports and graphic references. Furthermore, the program will have error checking capabilities that will provide feedback, ensuring ease-of-use for the end-user.

### 1.3. Definitions, acronyms, and abbreviations

- a) **DBF**. The file format where world data facts and figures are stored.
- b) **Field**. The representation of a collective group of data in the DBF file.
- c) **Lasso zoom**. Marquee zoom.
- d) **SHP**. The file format containing each country's shape through vertices that will be used to render an image of the world map.
- e) **Viewport**. The area where the map will be displayed.

### 1.4. References

*IEEE Recommended Practice for Software Requirements Specifications* (IEEE Std 830-1998) by the IEEE Computer Society. 20 October 1998. SH94654.

### 1.5. Overview

The succeeding parts will provide an in-depth description of the program, starting with the visual look, then the necessary conditions (i.e. internal and external factors) to successfully utilize the program, to the specific components, functions, and actions the program will take to process user requests. The overall description is reared more towards the end-user while the specific requirements is towards the developer.



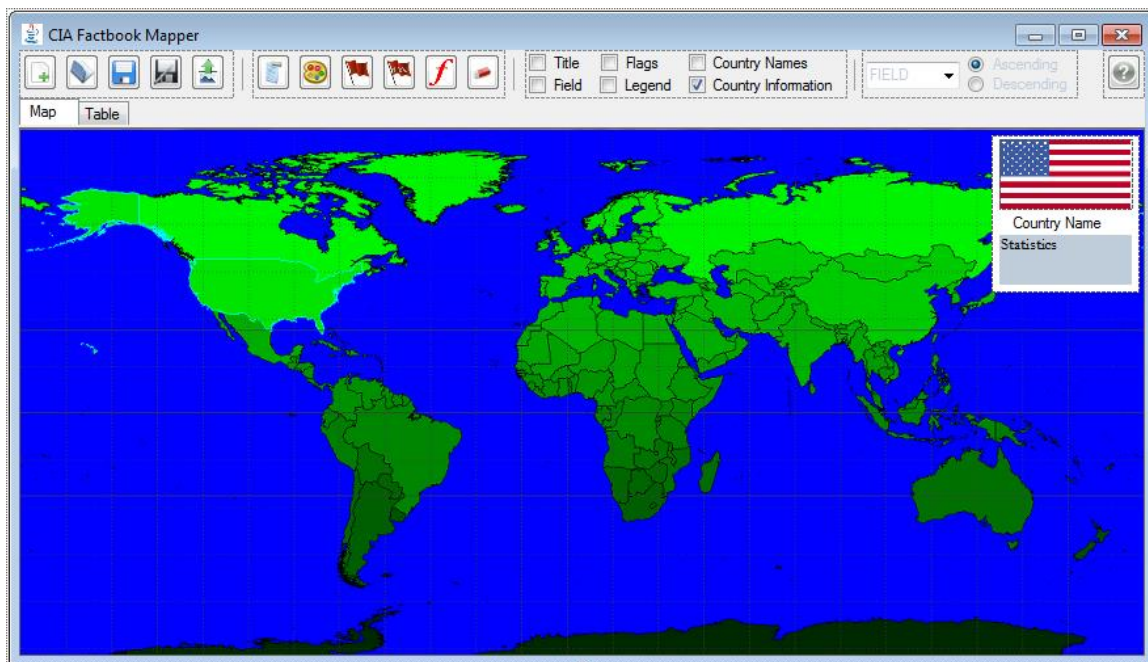


Figure 2. Map tab view

Clicking any of the first five buttons in the second group of the menu bar will trigger the program to display a dialog box that will require user input.

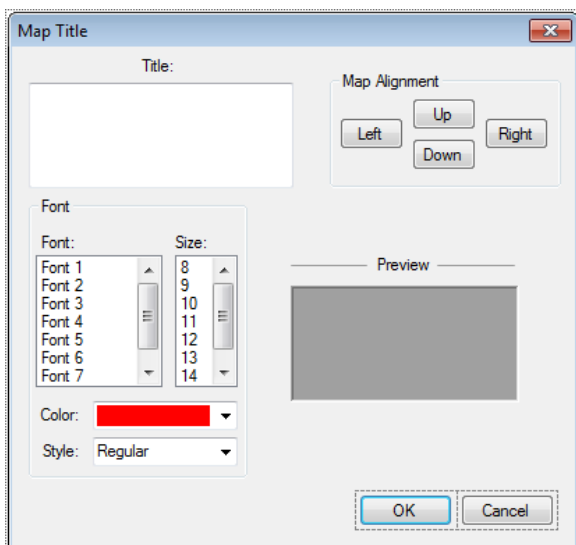


Figure 3. Map Title dialog

This dialog will be displayed when the user clicks the first button. It has the function to edit the map title to be shown to the viewport.

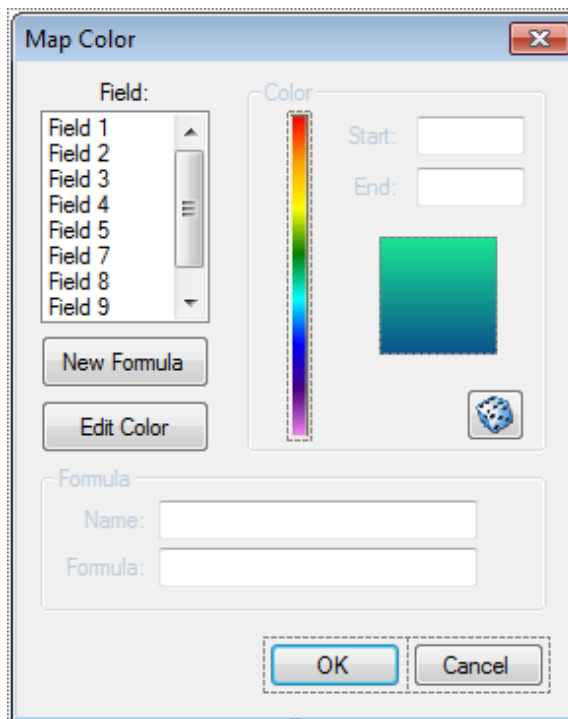


Figure 4. Map Color dialog

This dialog will be displayed when the user clicks the second button. It has the function to color the map according to user preferences.



Figure 5. Country Flags dialog

This dialog will be displayed when the user clicks the third button. It has the function to set the flag size for all countries displayed on the viewport.

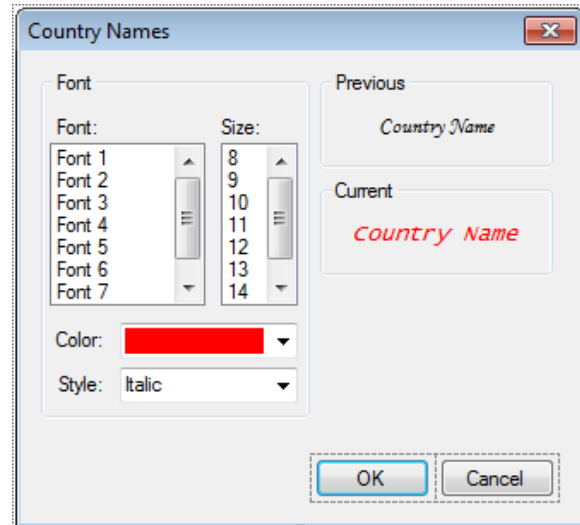


Figure 6. Country Names dialog

This dialog will be displayed when the user clicks the fourth button. It has the function to set how the country names should look for all countries displayed on the viewport.

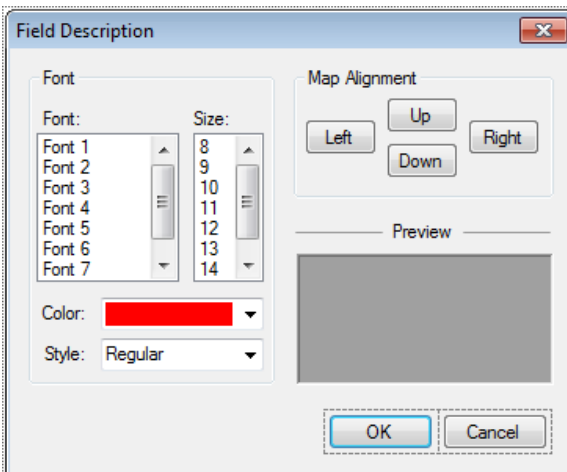


Figure 7. Field Description dialog

This dialog will be displayed when the user clicks the fifth button. It has the function to set how the field description should look on the viewport.

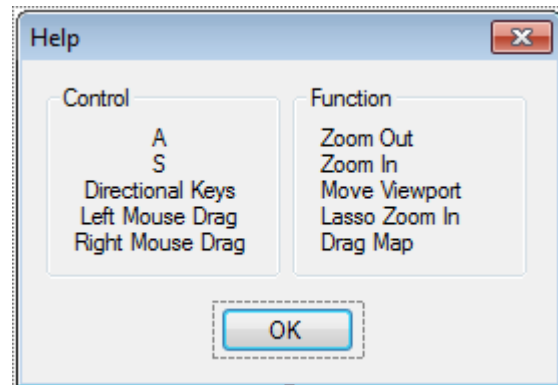


Figure 8. Help dialog

This dialog will be displayed when the user clicks the help button. It lists the available controls for the user to navigate and pan the map.

### 2.1.2. Hardware interfaces

Hardware requirements to utilize all application functionality include keyboard, mouse, and full-screen support.

### 2.1.3. Software interfaces

The application will work in any platform with Java SE 6.0 Runtime Environment. This is necessary as the application will be created using a Java IDE.

### 2.1.4. Operations

The application will provide wide range of functions accessible to the user to view, edit, save, and publish a world map graphic. The following figures show several use-case diagrams with a brief description on how a user may complete a specific task.

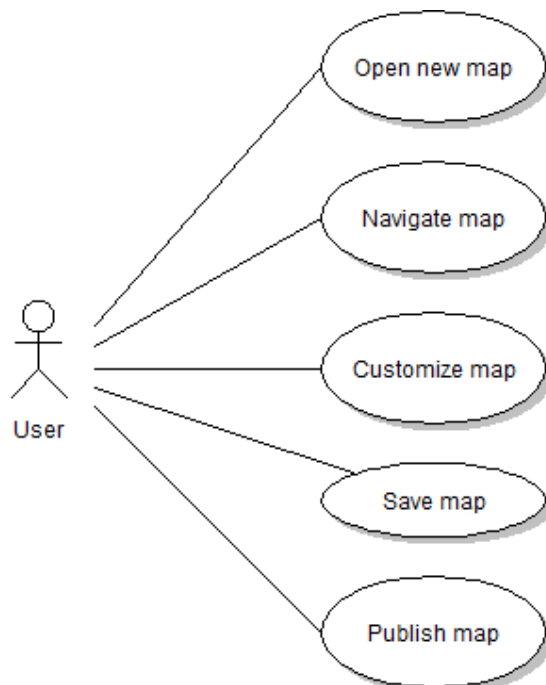


Figure 9. General Case: Open to publish a map

This shows the overall functionality of the application. Here, the user opens a new world map that is colored using the default colors set by the program. The user navigates the map with keyboard and/or mouse input. The user can then customize the map according to preference. Meanwhile, the user can save the customizations done on the map. Lastly, publishing the map will generate an image of the current map to be used outside the application.

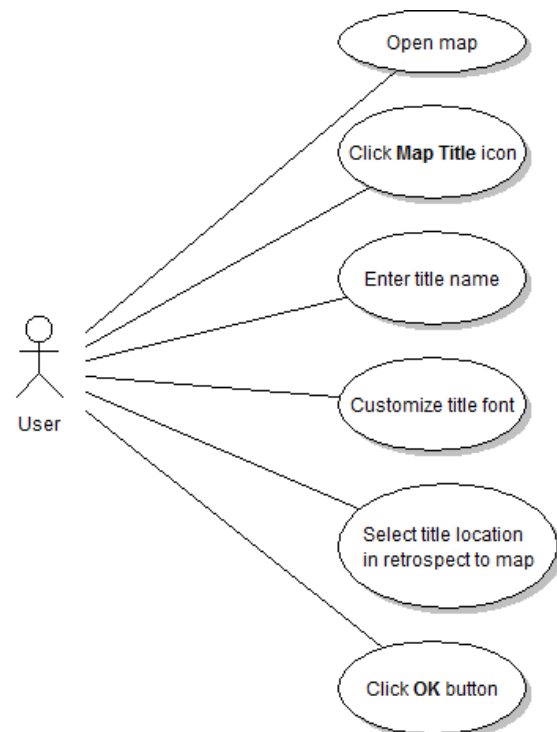


Figure 10. Add and customize map title

This shows how the user can customize the map title. Fig. 3 is the dialog box corresponding to the **Map Title** icon.



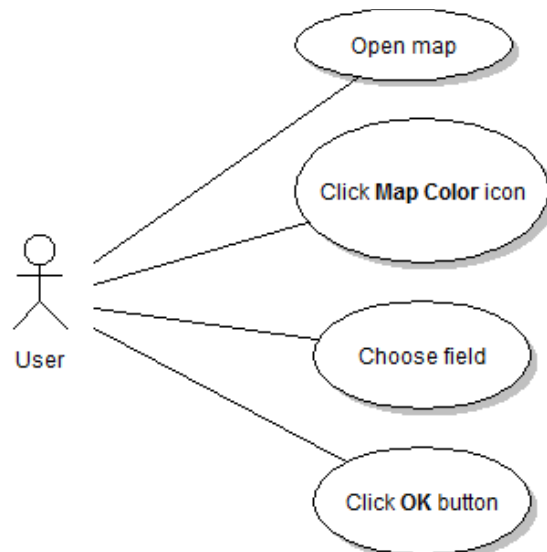


Figure 11. Choose a field to color the map

This shows how the user can view the map with colors subject to a specific statistical data (i.e. field). Fig. 4 is the dialog box corresponding to the **Map Color** icon.

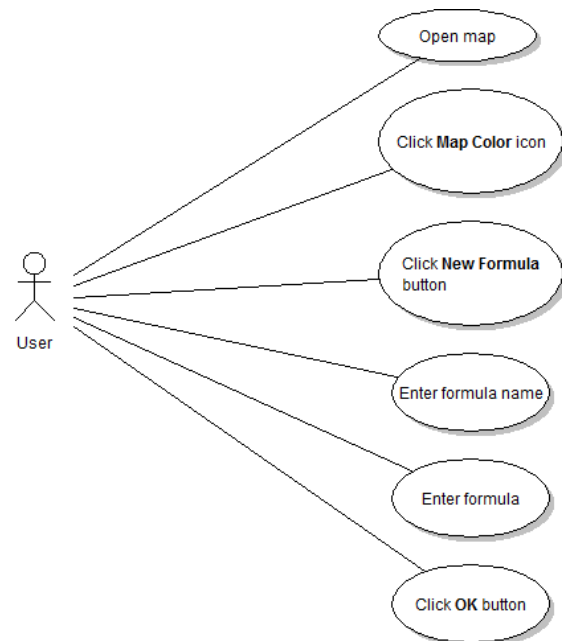


Figure 12. Create a new field and formula

This shows how the user can set a new way to color the map. Fig. 4 is the dialog box corresponding to the **Map Color** icon.

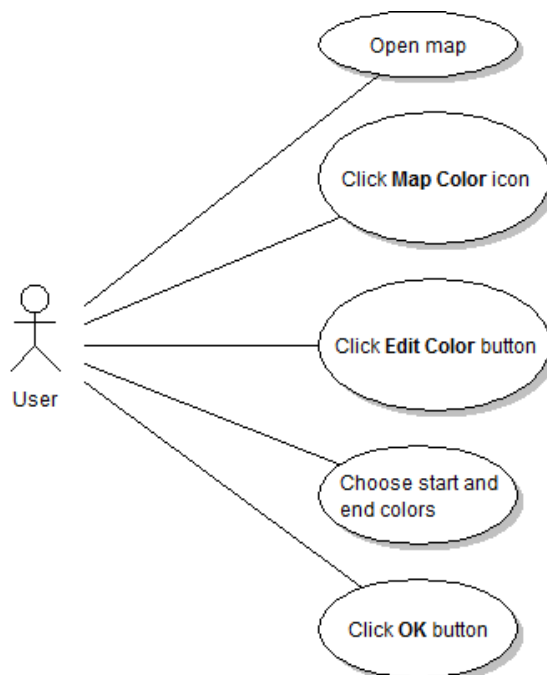


Figure 13. Choose a preferred color map gradient

This shows how the user can set a preferred gradient to color the map. Fig. 4 is the dialog box corresponding to the **Map Color** icon.

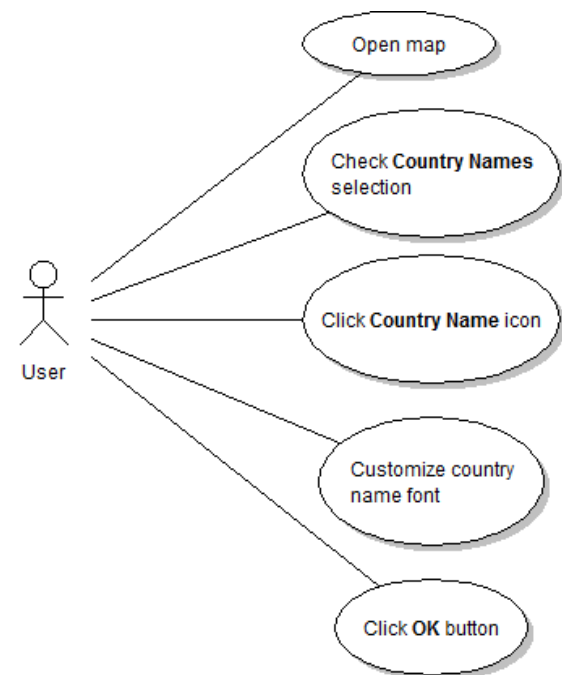


Figure 14. Display and customize country names

This shows how the user can customize country names. Fig. 6 is the dialog box corresponding to the **Country Name** icon.

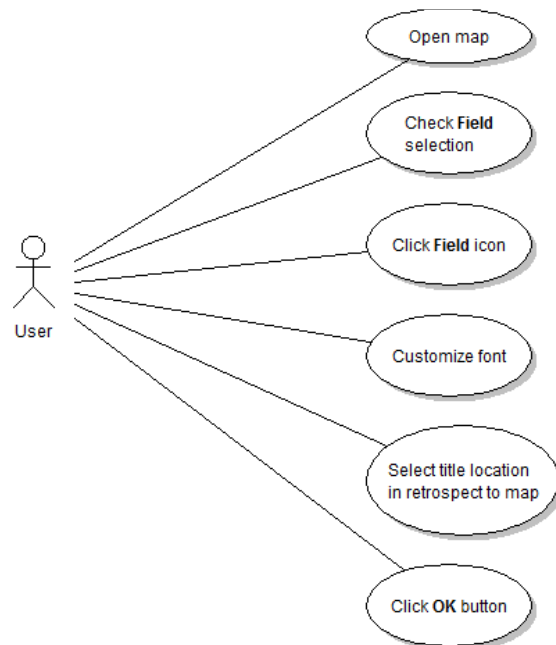


Figure 15. Display and customize field description

This shows how the user can customize how the field description is displayed on the map. The field description will be contained in a box, similar to that of the *map legend*. Fig. 7 is the dialog box corresponding to the **Field** icon.

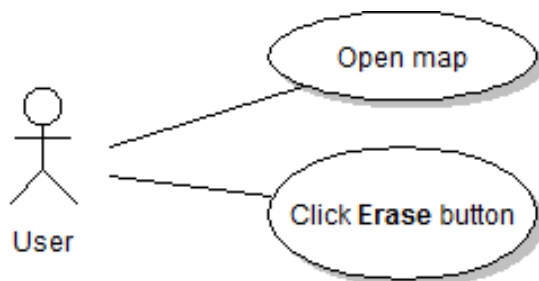


Figure 17. Return to default map

This shows how the user can revert back to the original political map. It means removing field and color preferences to the current map and setting it to default coloring. Fig. 2 is the window containing the **Erase** icon.

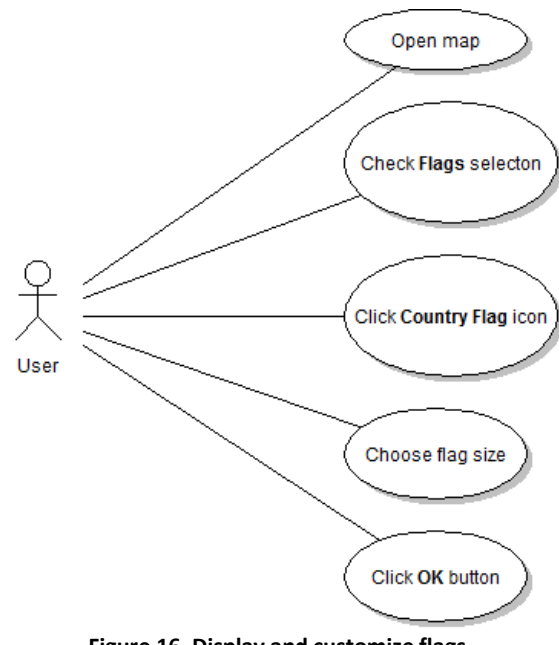


Figure 16. Display and customize flags

This shows how the user can customize the flags displayed on the map. Fig. 5 is the dialog box corresponding to the **Country Flag** icon.

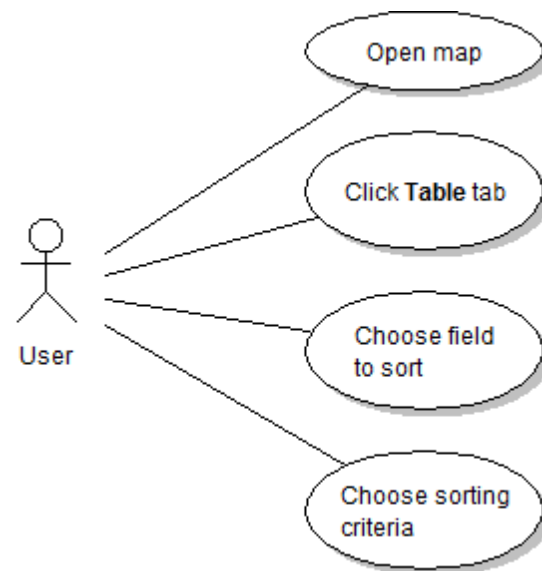


Figure 18. Sort table

This shows how the user can sort the data in the table tab. Fig. 1 is the window containing the sorting function.

## 2.2. Product functions

- a) **Open and save.** The application will allow the user to open a previously saved map and render it on the viewport, as well as save a current map.
- b) **Image exporting.** The application will be able to generate an image that represents the current map settings into a file format the user can easily view outside the application.
- c) **Political world map viewing.** The application will be able to show a political map with default colors per country upon creation of a new map. In addition, the user can change back to this default map settings.
- d) **DBF table viewing.** The user will be able to view and sort all of the raw .dbf data.
- e) **Map navigation.** The user will be able to navigate the map with keyboard and mouse input.
- f) **Map color settings.** The user will be able to choose the field to color the map, which includes having the option to create a new field (and formula) and the option to choose a color besides the randomly generated color.
- g) **Custom rendering options.** The user will be able to select optional rendering features like displaying the country name, country flag, and field description, as well as the options on how they are shown on the map.
- h) **Map title.** The user will be able to add a title into the map. Additional features include editing the look and location of the title.
- i) **Map legend.** The application will be able to provide the user a graphic that helps translate what the colors mean.
- j) **Country mouse-over information.** When selected, the application will display the information of the country currently hovered by the mouse. The information displayed includes the country name and flag, and the statistics for the current field.

## 2.3. User characteristics

The user of the application must have a basic amount of computer knowledge which includes providing keyboard and mouse input, and be familiar with dialogs like the file chooser dialog. The user must also know mathematical operations (i.e. addition, subtraction, multiplication, division) and is able to form expressions with variables. In addition, the user must know how to use map legends to interpret the graphic representation of the map.

## 3. Specific requirements

### 3.1. External interface requirements

#### 3.1.1. User interfaces

##### 3.1.1.1. CIA Factbook Mapper frame (Fig. 1, Fig. 2)

###### 3.1.1.1.1. New Map button

When user clicks this button, a new customizable map where each country is filled in its own color will be displayed on the **Map** tab. If there is a current unsaved map on the map tab, it will prompt the user for action.

###### 3.1.1.1.2. Open File button

When user clicks this button, an open file chooser dialog will be displayed that gives the user the option to select a previously saved file and display it on the **Map** tab. If there is a current unsaved map on the map tab, it will prompt the user for action.

**3.1.1.1.3. Save button**

When user clicks this button, the program will save any changes made into the map using the current file name. This will only be enabled when there is a map on the **Map** tab.

**3.1.1.1.4. Save As button**

When user clicks this button, a save file chooser dialog will be displayed that gives the user the option to save the map using a different file name. This will only be enabled when there is a map on the **Map** tab.

**3.1.1.1.5. Export Map button**

When user clicks this button, a save file chooser dialog will be displayed that gives the user the option to give a file name to the custom map image that will be generated by the program. This will only be enabled when there is a map on the **Map** tab.

**3.1.1.1.6. Map Title button**

When user clicks this button, the **Map Title** dialog will be displayed that allows the user to add/edit the map title. This is enabled only on the **Map** tab.

**3.1.1.1.7. Map Colors button**

When user clicks this button, the **Map Color** dialog will be displayed that allows the user to choose how the map will be colored. This is enabled only on the **Map** tab.

**3.1.1.1.8. Country Flags button**

When user clicks this button, the **Country Flags** dialog will be displayed that allows the user to choose how the flags will be displayed on the map. This is enabled only on the **Map** tab.

**3.1.1.1.9. Country Names button**

When user clicks this button, the **Country Names** dialog will be displayed that allows the user to choose how the country names will be displayed on the map. This is enabled only on the **Map** tab.

**3.1.1.1.10. Field Description button**

When user clicks this button, the **Field Description** dialog will be displayed that allows the user to choose how the field description will be displayed on the map. This is enabled only on the **Map** tab.

**3.1.1.1.11. Erase button**

When user clicks this button, it will reset coloring settings back to default. It will display a confirmation message to the user. This is enabled only on the **Map** tab.

**3.1.1.1.12. Title check box**

- Selecting will display the title pre-defined by the user on the map.
- Deselecting will remove the displayed title on the map.

NOTE: This is enabled only on the **Map** tab.

#### 3.1.1.1.13.

##### **Flags check box**

- Selecting will display the country flags on the map.
- Deselecting will remove the country flags displayed on the map.

NOTE: This is enabled only on the **Map** tab.

#### 3.1.1.1.14.

##### **Country Names check box**

- Selecting will display the country names on the map.
- Deselecting will remove the country names displayed on the map.

NOTE: This is enabled only on the **Map** tab.

#### 3.1.1.1.15.

##### **Field check box**

- Selecting will display the description of the field currently being used by the program on the map.
- Deselecting will remove the field description displayed on the map.

NOTE: This is enabled only on the **Map** tab.

#### 3.1.1.1.16.

##### **Legend check box**

- Selecting will display the descriptions of the data (i.e. the meaning of colors) on the map.
- Deselecting will remove the data description displayed on the map.

NOTE: This is enabled only on the **Map** tab.

#### 3.1.1.1.17.

##### **Country Information check box**

- Selecting will enable the function to display a little box of information currently hovered by the mouse.
- Deselecting will disable said function.

NOTE: This is enabled only on the **Map** tab.

#### 3.1.1.1.18.

##### **Field combo box**

The item chosen in this combo box will determine the field the user wants to sort in the **Table** tab. This is enabled only on the **Table** tab.

#### 3.1.1.1.19.

##### **Ascending radio button**

Selecting will sort the specified field in increasing order. Only one of the two radio buttons can be selected at a time. This is enabled only on the **Table** tab.

#### 3.1.1.1.20.

##### **Descending radio button**

Selecting will sort the specified field in decreasing order. Only one of the two radio buttons can be selected at a time. This is enabled only on the **Table** tab.

#### 3.1.1.1.21.

##### **Help button**

When user clicks this button, the **Help** dialog will be displayed that shows the user input controls on the map. This is enabled only on the **Map** tab.

**3.1.1.1.22. Map tab**

A view of the map will be displayed on this tab. When there is no file selected, it will show a blank panel.

**3.1.1.1.23. Table tab**

A view of the map data in the form of a table will be displayed on this tab. When there is no file selected, it will show a blank panel.

**3.1.1.2. Map Title dialog (Fig. 3)****3.1.1.2.1. Title text area**

Anything entered in this text box will be used as the title of the map. There will be no limit to the number of characters the user types in.

**3.1.1.2.2. Up button**

When user clicks this button, the position of the title on the map will be moved up by, in geographic terms, 10 degrees until it reaches the top edge of the map. A sample will be displayed on the **Preview** box.

**3.1.1.2.3. Left button**

When user clicks this button, the position of the title on the map will be moved to the left by, in geographic terms, 10 degrees until it reaches the left edge of the map. A sample will be displayed on the **Preview** box.

**3.1.1.2.4. Down button**

When user clicks this button, the position of the title on the map will be moved down by, in geographic terms, 10 degrees until it reaches the bottom edge of the map. A sample will be displayed on the **Preview** box.

**3.1.1.2.5. Right button**

When user clicks this button, the position of the title on the map will be moved to the right by, in geographic terms, 10 degrees until it reaches the right edge of the map. A sample will be displayed on the **Preview** box.

**3.1.1.2.6. Font list**

The selection in this list will change the font of the map title to the corresponding font. A sample will be displayed on the **Preview** box.

**3.1.1.2.7. Size list**

The selection in this list will change the size of the map title to the corresponding size. A sample will be displayed on the **Preview** box.

**3.1.1.2.8. Color combo box**

The selection in this combo box will change the color of the map title to the corresponding color. A sample will be displayed on the **Preview** box.

**3.1.1.2.9. Style combo box**

The selection in this combo box will change the style of the map title to the corresponding style. A sample will be displayed on the **Preview** box.

**3.1.1.2.10. OK button**

Accepts the changes made on the map title and closes the dialog. This will be enabled/disabled depending on whether the text fields are completed.

**3.1.1.2.11. Cancel button**

Closes the dialog and leaves the map title unchanged.

**3.1.1.3. Map Color dialog (Fig. 4)**

**3.1.1.3.1. Color slider**

Sets the start and end values of the color gradient of the map, as specified by the user. This will only be enabled when user clicks the **Edit Color** button and selects one of the text fields. The value pointed to by the slider knob will be displayed on the text field.

**3.1.1.3.2. Start text field**

Allows the user to enter a numeric start value of the color gradient of the map. It will only accept numeric values from 0 to 255. This will only be enabled when user clicks the **Edit Color** button.

**3.1.1.3.3. End text field**

Allows the user to enter a numeric end value of the color gradient of the map. It will only accept numeric values from 0 to 255. This will only be enabled when user clicks the **Edit Color** button.

**3.1.1.3.4. Random Color button**

When user clicks this button, the program will select a random set of colors to color the map. This button will only be enabled when a set data (i.e. textual field type) is selected and the **Edit Color** button was clicked.

**3.1.1.3.5. Field list**

The selection in this list will be used on how the map is colored.

**3.1.1.3.6. New Formula button**

When user clicks this button, the program will enable the function to add a new field to the list.

**3.1.1.3.7. Edit Color button**

When user clicks this button, the program will enable the function to specify the colors of the map, as per user preference.

**3.1.1.3.8. Name text field**

Anything typed in this text box will be the name of the new field. There will be a limit to the number of characters entered. This will only be enabled when user clicks the **New Formula** button.

**3.1.1.3.9. Formula text field**

The expression typed in this text box will represent the new field that will be used to color the map. The program will check if the expression is legal. This will only be enabled when user clicks the **New Formula** button.

**3.1.1.3.10. OK button**

Accepts the map color preferences and closes the dialog.

**3.1.1.3.11. Cancel button**

Closes the dialog and leaves the map colors unchanged.

**3.1.1.4. Country Flags dialog (Fig. 5)**

**3.1.1.4.1. Increase size button**

Increases the size of the flags to be displayed on the map. There will be a limit to how big the flags are.

**3.1.1.4.2. Decrease size button**

Decreases the size of the flags to be displayed on the map. There will be a limit to how small the flags are.

**3.1.1.4.3. OK button**

Accepts the flag size and closes the dialog.

**3.1.1.4.4. Cancel button**

Closes the dialog and leaves the flag size unchanged.

**3.1.1.5. Country Names dialog (Fig. 6)**

**3.1.1.5.1. Font list**

The selection in this list will change the font of the country names to the corresponding font and display a sample on the **Current Country Name** box.

**3.1.1.5.2. Size list**

The selection in this list will change the size of the country names to the corresponding size and display a sample on the **Current Country Name** box.

**3.1.1.5.3. Color combo box**

The selection in this combo box will change the color of the country names to the corresponding color and display a sample on the **Current Country Name** box.

**3.1.1.5.4. Style combo box**

The selection in this combo box will change the style of the country names to the corresponding style and display a sample on the **Current Country Name** box.

**3.1.1.5.5. OK button**

Accepts the changes made on country names and closes the dialog.

**3.1.1.5.6. Cancel button**

Closes the dialog and leaves the font of country names unchanged.

**3.1.1.6. Field Description dialog (Fig. 7)**

**3.1.1.6.1. Font list**

The selection in this list will change the font of the field description to the corresponding font and display a sample on the **Preview** panel.

**3.1.1.6.2. Size list**

The selection in this list will change the size of the country names to the corresponding size and display a sample on the **Preview** panel.



**3.1.1.6.3. Color combo box**

The selection in this combo box will change the color of the country names to the corresponding color and display a sample on the **Preview** panel.

**3.1.1.6.4. Style combo box**

The selection in this combo box will change the style of the country names to the corresponding style and display a sample on the **Preview** panel.

**3.1.1.6.5. Up button**

When user clicks this button, the position of the field description on the map will be moved up by, in geographic terms, 10 degrees until it reaches the top edge of the map, and display a sample on the **Preview** panel.

**3.1.1.6.6. Left button**

When user clicks this button, the position of the field description on the map will be moved to the left by, in geographic terms, 10 degrees until it reaches the left edge of the map, and display a sample on the **Preview** panel.

**3.1.1.6.7. Down button**

When user clicks this button, the position of the field description on the map will be moved down by, in geographic terms, 10 degrees until it reaches the bottom edge of the map, and display a sample on the **Preview** panel.

**3.1.1.6.8. Right button**

When user clicks this button, the position of the field description on the map will be moved to the right by, in geographic terms, 10 degrees until it reaches the right edge of the map, and display a sample on the **Preview** panel.

**3.1.1.6.9. OK button**

Accepts the changes made on the field description and closes the dialog.

**3.1.1.6.10. Cancel button**

Closes the dialog and leaves the field description unchanged.

**3.1.1.7. Help dialog (Fig. 8)****3.1.1.7.1. OK button**

Closes the dialog.

**3.2. Functional requirements****3.2.1. User tries to exit application without saving.**

The program will prompt the user for an action and confirmation before closing the application.

**3.2.2. User enters a value in the Start/End text field besides 0-255.**

The program shall automatically set the value in the text box to 0 or 255, depending on which user-entered-value is closest.

**3.2.3. User enters an invalid formula in the Formula text field.**

The program shall display an error message to the user upon clicking the OK button.

**3.3. Performance requirements**

The application will support one terminal and one user at a time. DBF and SHP files shall be read into the program in less than 5 s. Saving and generating a map and image, respectively, shall take less than 5 s to complete.

## Appendix

### A.1 GUI components hierarchy

- ❖ CIA Factbook Mapper frame (Fig. 1, Fig. 2)
  - North panel
    - First panel of north panel
      - New map button
      - Open file button
      - Save button
      - Save as button
      - Export map button
    - Vertical separator
    - Second panel of north panel
      - Map title button
      - Map color button
      - Country flags button
      - Country names button
      - Field description button
    - Vertical separator
    - Third panel of north panel
      - Title check box
      - Flags check box
      - Country names check box
      - Field check box
      - Legend check box
      - Country information check box
    - Vertical separator
    - Fourth panel of north panel
      - Field combo box
      - Sort button group
        - ◆ Ascending radio button
        - ◆ Descending radio button
    - Fifth panel of north panel
      - Help button
  - South panel
    - View tabbed pane
      - Map panel
      - Table panel
        - ◆ Table scroll pane
        - ◆ DBF table
- ❖ Map Title dialog (Fig. 3)

- North panel
  - Title label
  - Title scroll pane
    - Title text area
  - Alignment box panel
    - Up button
    - Left button
    - Down button
    - Right button
- Center panel
  - Font box panel
    - Font label
    - Size label
    - Font list
    - Size list
    - Color label
    - Color combo box
    - Style label
    - Style combo box
  - Preview panel
- South panel
  - OK button
  - Cancel button
- ❖ Map Color dialog (Fig. 4)
  - North panel
    - Field label
    - Color box panel
      - Color slider
      - Start label
      - Start text field
      - End label
      - End text field
      - Sample gradient box panel
      - Random color button
    - Field list
    - New formula button
    - Edit color button
  - Center panel
    - Name label
    - Name text field
    - Formula label

- Formula text field
- South panel
  - OK button
  - Cancel button
- ❖ Country Flags dialog (Fig. 5)
  - North panel
    - Previous flag label
    - Current flag label
    - Increase size button
    - Decrease size button
  - South panel
    - OK button
    - Cancel button
- ❖ Country Names dialog (Fig. 6)
  - North panel
    - Font box panel
      - Font label
      - Size label
      - Font list
      - Size list
      - Color label
      - Color combo box
      - Style label
      - Style combo box
    - Previous country name text field
    - Current country name text field
  - South panel
    - OK button
    - Cancel button
- ❖ Field Description dialog (Fig. 7)
  - North panel
    - Font box panel
      - Font label
      - Size label
      - Font list
      - Size list
      - Color label
      - Color combo box
      - Style label
      - Style combo box
    - Alignment box panel

- Up button
  - Left button
  - Down button
  - Right button
  - Preview panel
- South panel
  - OK button
  - Cancel button
- ❖ Help dialog (Fig. 8)
  - North panel
    - Control list label
    - Function list label
  - South panel
    - OK button