CLOCK PROGRAMMING ASSIGNMENT

Write a complete Java application that creates the following GUI and adheres to the specifications given below.

1. The clock application allows the user to convert between civilian time and military time.
   1.1. Civilian time must be displayed using hour and minute text fields and a meridiem combo box.
       1.1.1. These four components (including the colon label) must be placed into a horizontal box spaced apart by at least 5 pixels.
       1.1.2. The text fields’ contents must be center aligned in red 24-point Courier New typeface.
       1.1.3. The colon label and meridiem combo box must display in blue 24-point Dialog typeface.
       1.1.4. The Civilian time box must have a titled lowered etched border. The title must be top left aligned, 18-point Garamond typeface and colored blue.
   1.2. Military time is displayed using the military time text field.
       1.2.1. This text field contents must be center aligned in red 24-point Courier New typeface.
       1.2.2. It must have a titled lowered etched border. The title must be top left aligned, 18-point Garamond typeface and colored blue.
       1.2.3. When converting civilian time to military time the word hours must be added to the time display.
1.2.4. When converting military time to civilian time, the display must hold the number only.

1.3. **A direction combo box determines the direction of the conversion and is triggered by a Convert control button.**

1.3.1. These two components must be placed into a horizontal box spaced apart by at least 5 pixels.

1.3.2. The Convert button’s caption is “CONVERT” in blue 24-point Dialog typeface.

1.3.3. The direction combo box has two items: *To Military* and *To Civilian*, in blue 24-point Dialog typeface.

1.4. The horizontal boxes and military text field must be placed into a vertical box.

1.4.1. They must be spaced apart by at least 25 pixels.

1.4.2. They must be center aligned with the vertical box.

1.4.3. The box must have a compound titled border combining a 20-pixel thick gray line wrapped around a 25-pixel thick empty border. The title (“You’re in the Army Now”) must be above-top center aligned, 18-point Garamond typeface and colored black.

2. **The Convert control button, when clicked:**

2.1. **If the direction combo box is *To Military***:

2.1.1. Input and validate the civilian time shown in the hour and minute text fields and the meridiem combo box, convert it to military time and display the result in the military time text field.

2.1.2. The military time must be displayed in the format hhmm followed by the word *hours*.

2.2. **If the direction combo box is *To Civilian***:

2.2.1. Input and validate the military time shown in the military time text field, convert it to military time and display the result the hour and minute text fields and the meridiem combo box.

2.2.2. The hour should be displayed as 1 or 2 digits as needed. For example, 1 o’clock or 12 o’clock.

2.2.3. The minute must be displayed in two digits. For example, 08 or 25.

3. **The GUI must never show incorrect results.**

3.1. If the direction combo box is changed, all text fields must be erased.

3.2. Any change to one of the three “Civilian Time” components must cause the “Military Time” text field to be erased.

3.2.1. Change to a text component occurs when at least one character of its text is changed, inserted or deleted.

3.2.2. Change to the meridiem combo box occurs when its item is switched to the alternate value (i.e. clicking and retaining the item’s value is not changing the combo box).
3.3. Any change to the “Military Time” text field must cause the two “Civilian Time” text fields to be erased.

3.3.1. Change to a text component occurs when at least one character of its text is changed, inserted or deleted.

4. To improve the user interaction, whenever any text component gets focus, its entire text contents must be highlighted.

5. Input Validation

5.1. Civilian time must be validated.

5.1.1. Hour

5.1.1.1. Must be a number.

5.1.1.2. If not, this dialog must be displayed:

![Dialog 1]

5.1.1.3. Must be in the range 1 to 12.

5.1.1.4. If not, this dialog must be displayed:

![Dialog 2]

5.1.1.5. After the user clicks OK on the error dialog, the application must restore focus to the hour text field and select all of its contents. For example:
5.1.2. Minute
   5.1.2.1. Must be a number.
   5.1.2.2. If not, this dialog must be displayed:

   ![Message](image1)

   5.1.2.3. Must be in the range 00 to 59.
   5.1.2.4. If not, this dialog must be displayed:

   ![Message](image2)

   5.1.2.5. After the user clicks OK on the error dialog, the application must restore focus to the minute text field and select all of its contents.

5.2. Military time must be validated.
   5.2.1. Must be a number in the format \textit{hhmm}
   5.2.2. If not, this dialog must be displayed:

   ![Message](image3)

   5.2.3. \textit{hh} must be in the range 00 to 23.
   5.2.4. If not, this dialog must be displayed:

   ![Message](image4)
5.2.5. *mm* must be in the range 00 to 59.

5.2.6. If not, this dialog must be displayed:

![Message](Image)

5.2.7. After the user clicks OK on the error dialog, the application must restore focus to the military time text field and select all of its contents.