

# Task 3

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## Implemented functionalities

1. The time value should be updated every second, even when it is not displayed (as for example, when the chrono is running). However, time is not updated when it is being edited. (10 points)

**This feature is implemented and works as intended.**

2. Pressing the top right button turns on the background light. The light stays on for as long as the button remains pressed. From the moment the button is released, the light stays on for 2 more seconds, after which it is turned off. (15 points)

**This feature is implemented and works as intended.**

3. Pressing the top left button alternates between the chrono and the time display modes. The system starts in the time display mode. In this mode, the time (HH:MM:SS) and date (MM/DD/YY) are displayed. (15 points)

**This feature is implemented and works as intended.**

4. When in chrono display mode, the elapsed time is displayed MM:SS:FF (with FF hundredths of a second). Initially, the chrono starts at 00:00:00. The bottom right button is used to start the chrono. The running chrono updates in 1/100 second increments. Subsequently pressing the bottom right button will pause/resume the chrono. Pressing the bottom left button resets the chrono to 00:00:00. The chrono will keep running (when in running mode) or keep its value (when in paused mode), even when the watch is in a different display mode (for example, when the time is displayed).

Note: interactive simulation of a model containing time increments of 1/100 second is possible, but it is difficult to manually insert other events. Hence, while you are simulating your model, it is advisable to use larger increments (such as 1/4 second) for simulation purposes. (10 points)

**This feature is implemented and works as intended.**

5. When in time display mode, the watch will go into time editing mode when the bottom right button is held pressed for at least 1.5 seconds. (10 points)

### **This feature is implemented and works as intended**

6. When in time display mode, the alarm can be displayed and toggled between on or off by pressing the bottom left button. If the bottom left button is held for 1.5 seconds or more, the watch goes into alarm editing mode. This is not an example of good User Interface design, as going to editing mode will also toggle on/off and that may not be desired. It is however how the 1981 Texas Instruments LCD Alarm Chronograph works. The first time alarm editing mode is entered, the alarm time is set to 12:00:00. The alarm is activated when the alarm time is equal to the time in display mode. When it is activated, the screen will blink for 4 seconds, and then the alarm turns off. Blinking means switching to/from highlighted background twice per second. The alarm can be turned-off before the elapsed 4 seconds by a user interrupt (i.e.: if any button is pressed). After the alarm is turned off, activity continues exactly where it was left-off. (10 points)

### **The alarm can be toggled on and off. Feature is incomplete**

7. When in (either time or alarm) editing mode, briefly pressing the bottom left button will increase the current selection. Note that it is only possible to increase the current selection, there is no way to decrease or reset the current selection. If the bottom left button is held down, the current selection is incremented automatically every 0.3 seconds. Editing mode should be exited if no editing event occurs for 5 seconds. Holding the bottom right button down for 2 seconds will also exit the editing mode. (10 points)

**The time editing can be started.**

**Time and date can be edited.**

**The mode can be exited by holding the button for 2 seconds.**

**Alarm mode is incomplete, no alarm editing.**

## **Problems and lessons learnt**

We ran into multiple problems setting up the SVM framework to start up and run. Setting up the environment to use the correct versions of each system like Python was a bigger problem than first expected. Also the SVM tool itself was rather complicated to use, we couldn't make it not crash randomly.

# Exported PNML State Chart

See the repository for the .pnml file and bigger resolution picture.

