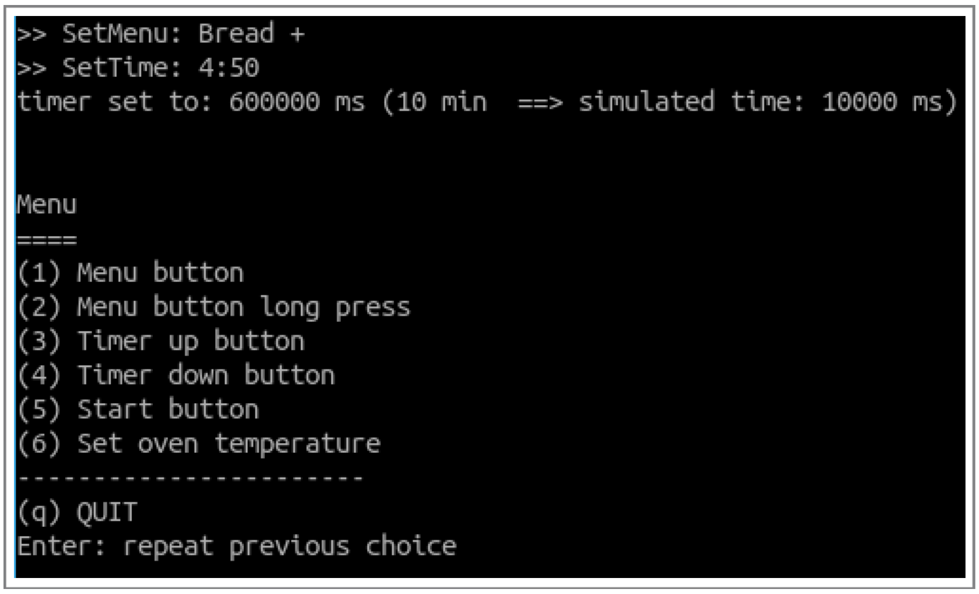
Bread bake machine Simulator



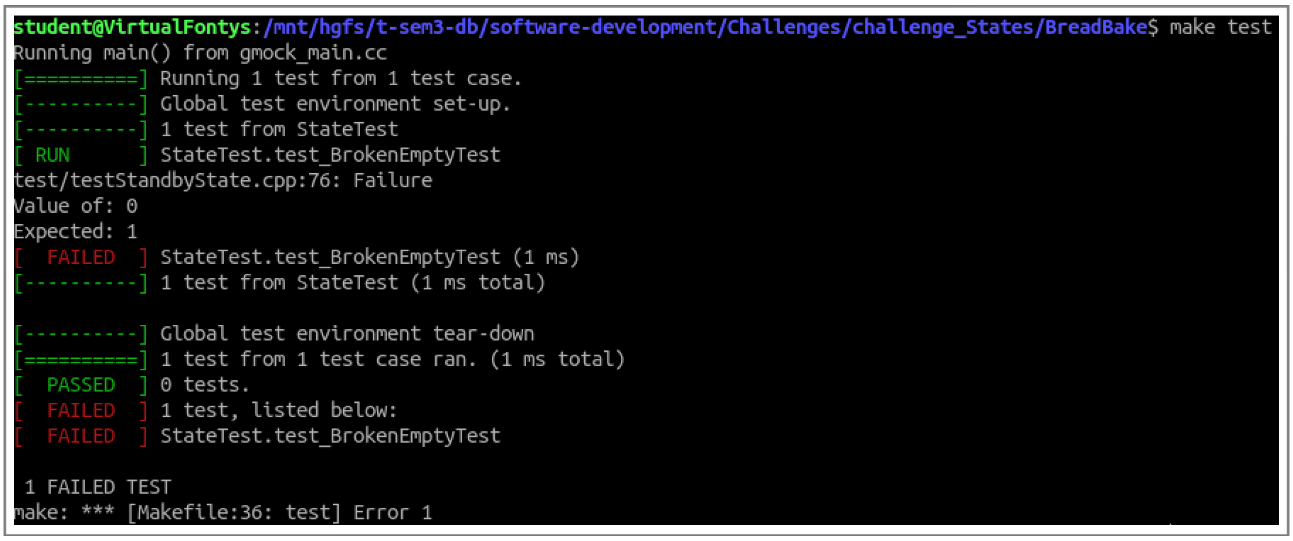
```
>> SetMenu: Bread +
>> SetTime: 4:50
timer set to: 600000 ms (10 min  ==> simulated time: 10000 ms)


Menu
====
(1) Menu button
(2) Menu button long press
(3) Timer up button
(4) Timer down button
(5) Start button
(6) Set oven temperature
-----------------------
(q) QUIT
Enter: repeat previous choice
```

Introduction

The breadbake project directory contains quite a bit of code. It contains:

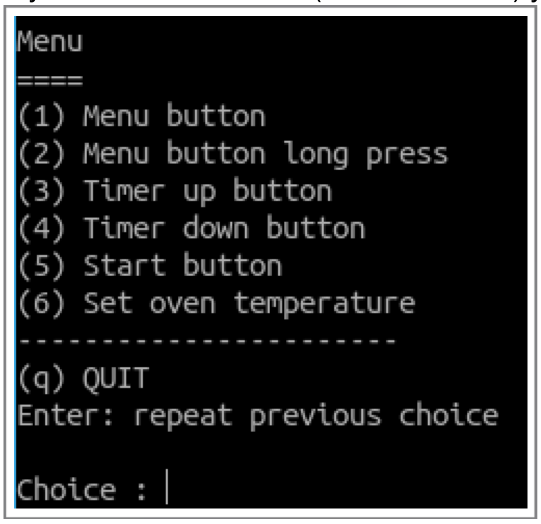
- a product directory with a complete simulation of the hardware layer
- a test directory with all mocks and an example unit test file
- a Makefile that is prepared for building the simulator (`make`) and for building + running your tests (`make test`)

The code compiles and runs properly. If you run the tests you will get the following results:



```
student@VirtualFontys:/mnt/hgfs/t-sem3-db/software-development/Challenges/challenge_States/BreadBake$ make test
Running main() from gmock_main.cc
[==========] Running 1 test from 1 test case.
[----------] Global test environment set-up.
[----------] 1 test from StateTest
[ RUN      ] StateTest.test_BrokenEmptyTest
test/testStandbyState.cpp:76: Failure
Value of: 0
Expected: 1
[  FAILED  ] StateTest.test_BrokenEmptyTest (1 ms)
[----------] 1 test from StateTest (1 ms total)

[----------] Global test environment tear-down
[==========] 1 test from 1 test case ran. (1 ms total)
[  PASSED  ] 0 tests.
[  FAILED  ] 1 test, listed below:
[  FAILED  ] StateTest.test_BrokenEmptyTest

 1 FAILED TEST
make: *** [Makefile:36: test] Error 1
```

If you run the simulator (`./breadbake`) you will get a running project:

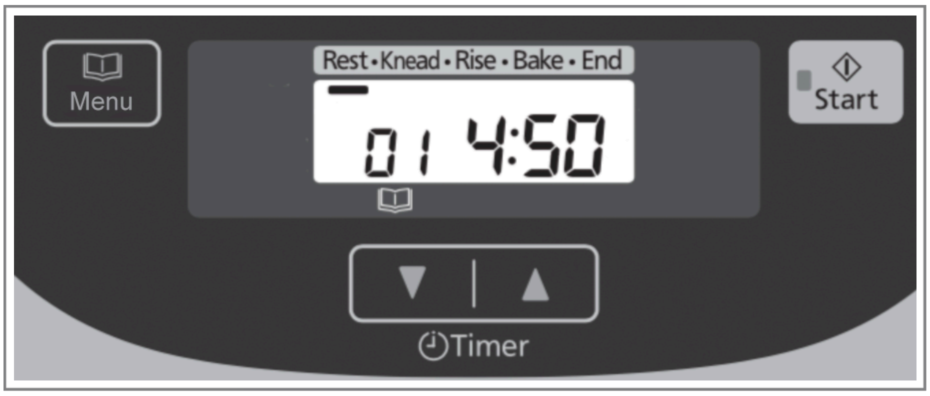


```
Menu
====
(1) Menu button
(2) Menu button long press
(3) Timer up button
(4) Timer down button
(5) Start button
(6) Set oven temperature
-----------------------
(q) QUIT
Enter: repeat previous choice

Choice : 
```

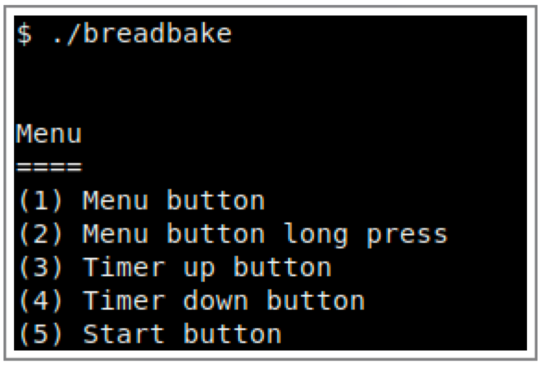
Of course: the bread baker state machine is not yet implemented, so the code doesn't respond to the button presses yet.

The Simulator

The simulator works pretty basic. The real system has some buttons:

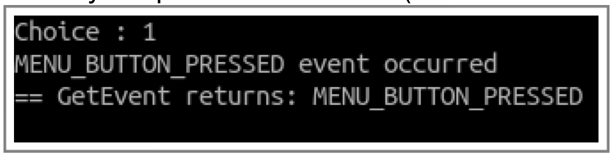


The simulator has the same "buttons" (i.e.: menu choices):



```
$ ./breadbake


Menu
====
(1) Menu button
(2) Menu button long press
(3) Timer up button
(4) Timer down button
(5) Start button
```

When you "press a UI button" (i.e.: enter a number and press <Enter>)



```
Choice : 1
MENU_BUTTON_PRESSED event occurred
== GetEvent returns: MENU_BUTTON_PRESSED
```

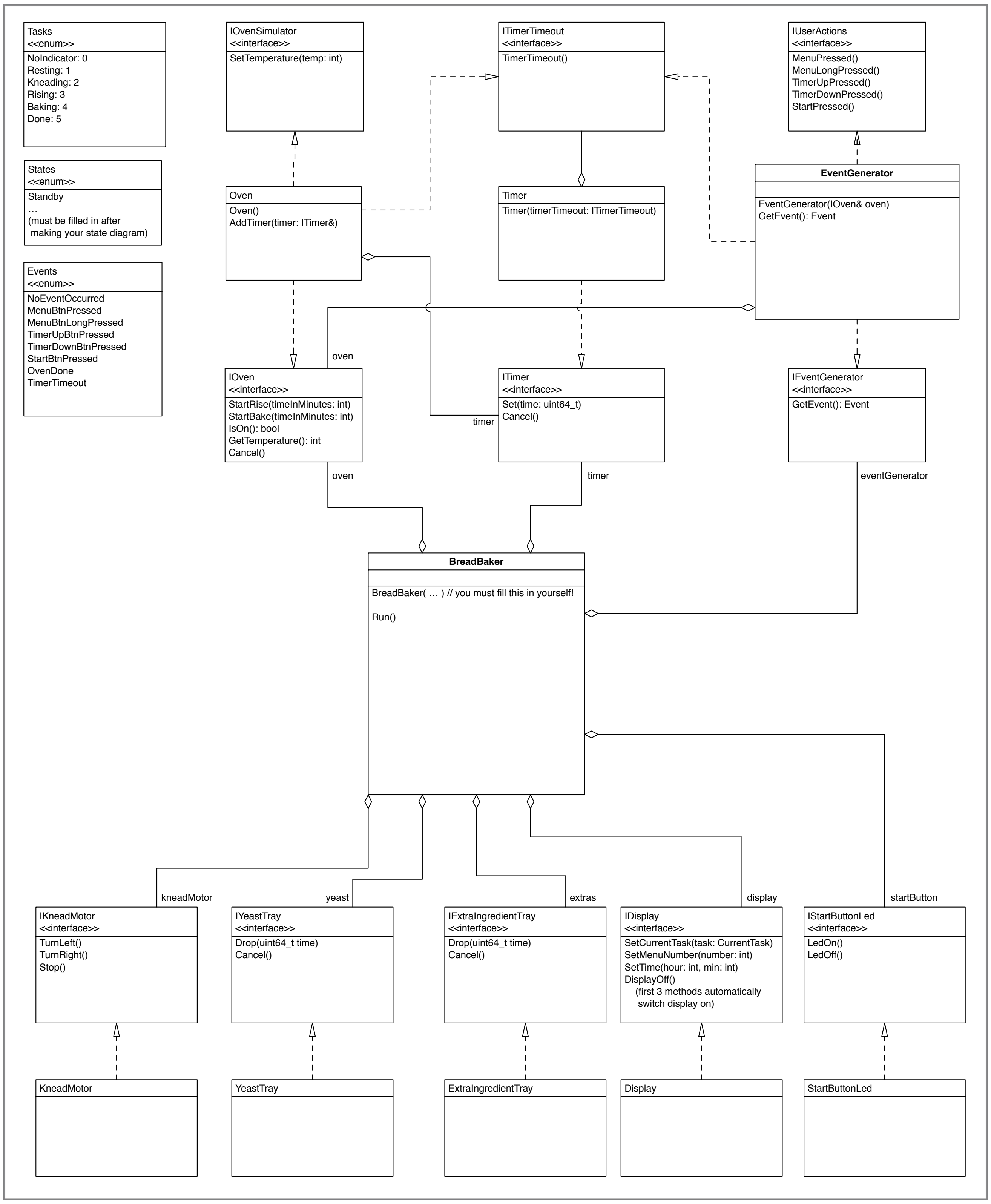
Some notes:

- Menu option 6 is implemented so you can control the oven's temperature to test if the machine starts when cold and doesn't start when hot.
- Lines that start with == are trace logging, you can disable log and/or trace messages in Log.cpp by changing the LogEnabled and/or TraceEnabled booleans.

Good Luck!

The Simulator: software design

CLASS DIAGRAM



Please note: the Log class is not mentioned in this diagram as it would only give extra clutter. All classes in the diagram use the Log class to log debug and trace information.

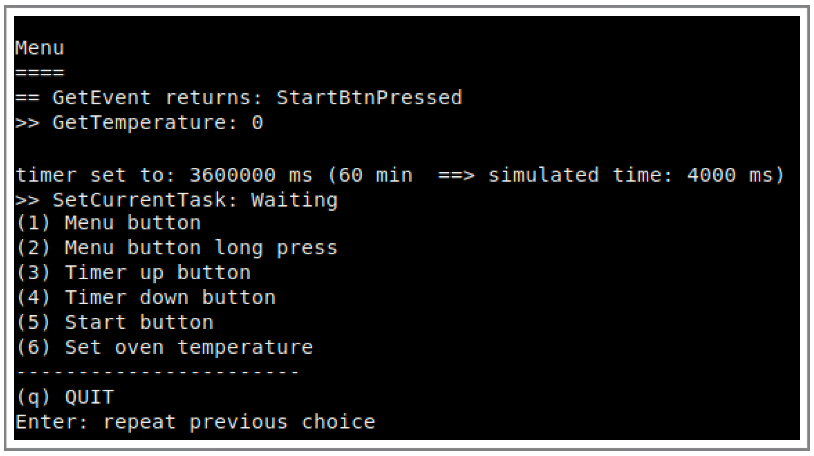
CLASS RESPONSIBILITIES

Class	Responsibility
BreadBaker	Implements the bread baker's state machine. `Run()` is already implemented and should be started in a separate thread. It keeps reading the latest event and feeds that to the state machine. This method stops when `quit` becomes true (same quit as in user interface). **TODO: implement state behaviour**
Oven	Simulates the bread baker's oven. It implements 2 interfaces: - IOven, which is the interface for the 'real' system - IOvenSimulator, which is only there so you can control the oven temperature from the user interface. Oven uses a Timer object for its timing.
Timer	Provides timer features to the bread bake machine. This class is not yet fully implemented but should work as follows: - Set should start a new thread that counts down the number of mili seconds (each time sleeping for 1 ms). After counting down, the TimerTimeout method is called on the provided ITimerTimeout interface. - Cancel should stop the timer. After calling Cancel, the TimerTimeout method will obviously not be called. - As both Oven and your state machine will use a different Timer object, you must make sure these 2 timers do not influence each other! *Please note that the private method GetSimulatedTime is implemented to make testing less annoying (it limits the number of ticks quite dramatically).* **TODO: implement the timer class**
EventGenerator	Queues system events. Events that are pushed (i.e. timer and UI events) are directly written into a queue. Events that need to be polled (oven) will be polled each time GetEvent is called.
KneadMotor YeastTray ExtraIngredientTray Display StartButtonLed	In a real bread baker these classes would talk to hardware, in the simulator all these classes do is write to the debug or trace log.
Log	Writes all log messages to std::cout. **TODO: Log will be called from multiple threads, make sure messages do not interfere each other**

An extra note on output to standard output: the user interface in main.cpp is written in such a way that it is more likely for you to see the synchronisation problem that occurs with writing to standard output from multiple threads.

The menu will be printed each second and it will wait 2 ms between printing each line. This makes sure you will be more likely to see problems like these:

Important: you are of course not allowed to change this. You must make sure all output to the terminal are properly synchronised.



```
Menu
====
== GetEvent returns: StartBtnPressed
>> GetTemperature: 0

timer set to: 3600000 ms (60 min  ==> simulated time: 4000 ms)
>> SetCurrentTask: Waiting
(1) Menu button
(2) Menu button long press
(3) Timer up button
(4) Timer down button
(5) Start button
(6) Set oven temperature
-----------------------
(q) QUIT
Enter: repeat previous choice
```

If you have any questions about the simulator, please ask your teacher!