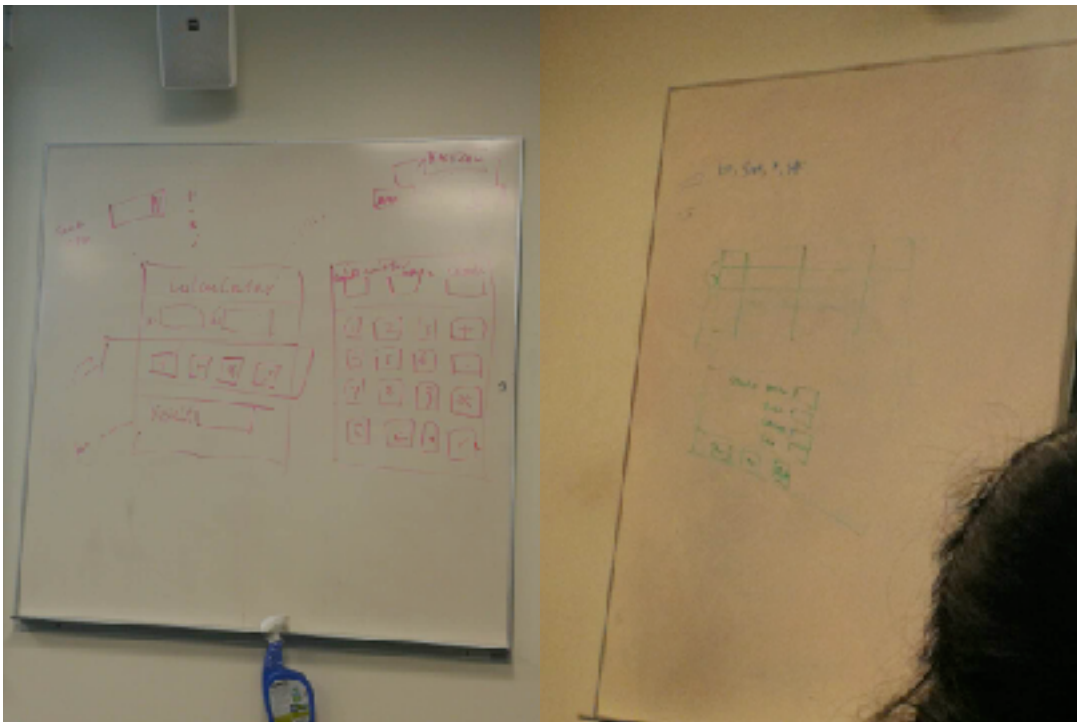
Assignment 8

Instructions

Max score is 10.
Deadline is 24: 00 April 11,Wednesday.
Extra credits are added only if total score is less than 10.

Question 1 and 2, please refer to the requirements given by professor in last lesson, design the calculator interface and student information system.(4 scores)



3.Write a program called ReverseHello.java that creates a thread (let's call it Thread 1). Thread 1 creates another thread (Thread 2); Thread 2 creates Thread 3; and so on, up to Thread 50. Each thread should print

Hello from Thread num!

but you should structure your program such that the threads print their greetings in reverse order. (Score 2)

4.You are to implement a controller for a device which can be accessed with the following interface:

```
  class Device {
    public void startup() { ... } // print to console that device
is starting
    public void shutdown() { ... } // print to console that device
is shutting down and exit
  }
```

There are also two sensors, one for heat and one for pressure, which can be used to monitor the device.

```
  class Sensor extends Thread {
      private final Device device;
      private double value;
      public Sensor(Device device) {
          this.device = device;
      }
      public double getValue() {
          return value;
      }
      public void updateValue() {
          this.value += 0.001; // you check with other values here
and see how it works
      }
      public void run() { ... }
```

```
}
```

Write a class Controller (extends Thread) that can poll the sensors concurrently to running the device. You should implement its run() method such that it starts the device and then monitors it by waiting for and examining any new sensor values. The controller shuts down the device if the heat sensor exceeds the value 70 or the pressure sensor the value 100. Also complete the run() method in the class Sensor which calls updateValue() continuously and signals the controller if its value has changed. You can print the heat and pressure value to console in the run() method of Controllerto check.

Here is the Root class that starts the application.(score 4)

```
  class Root {
    public static void main(String[] args) {

        Device device = new Device();
        Sensor heat = new Sensor(device);
        Sensor pressure = new Sensor(device);

        Controller controller = new
Controller(device,heat,pressure);

        controller.start();
        heat.start();
        pressure.start();
    }
}
```

Sample output

```
Device started
heat -> 0.00 , pressure -> 0.00
heat -> 0.80 , pressure -> 2.10
heat -> 15.50 , pressure -> 15.40
heat -> 30.30 , pressure -> 31.10
heat -> 66.40 , pressure -> 68.90
heat -> 68.70 , pressure -> 132.60
Device shutting down due to maintenance
```

Extra credit

Given a string that contains only digits `0-9` and a target value, return all possibilities to add **binary** operators (not unary) `+`, `-`, or `*`between the digits so they evaluate to the target value.(2 scores)

Examples:

```
"123", 6 -> ["1+2+3", "1*2*3"]
"232", 8 -> ["2*3+2", "2+3*2"]
"105", 5 -> ["1*0+5","10-5"]
"00", 0 -> ["0+0", "0-0", "0*0"]
"3456237490", 9191 -> []
```