

## overview

- This is the project for unit VI of cis 1.5. This project covers classes and the beginnings of object-oriented programming.
- The project is worth 10% of your term grade. It will be marked out of **10 points**.
- The project is due via email on **Wednesday May 20**.
- Email your C++ file to: `sklar@sci.brooklyn.cuny.edu`.

## creating a simple class.

For this assignment, you will write a program that involves defining and using a simple class.

Let's pretend that we are writing a program to control a sophisticated robot that will be used to help locate victims of a natural disaster. For example, you might be a rescue worker in the midwest helping to find victims buried in the rubble from tornadoes that leveled buildings, and your robot will help you accomplish your task. Your robot has multiple sensors:

- temperature sensor—to measure body heat, which can help detect if a human is nearby
- motion sensor—to detect if something nearby is moving
- sound sensor—to “listen” for noises
- red color sensor—to indicate if anything *red* is within the robot's visual range

Your robot operates by wandering around the wreckage and its sensors take measurements. Your job, for this assignment, is to create a data structure — a simple class — that will be able to store the measurements of your robot's sensors.

Note that you do not have to worry about the robot's motion (i.e., moving), you only need to worry about storing the robot's sensor readings.

Name your program: **sense.cpp** and submit **ONLY** this file.

1. Define a simple class called `sensors` that has the following data members:

- `temperature`, which is a real number indicating the temperature near the robot;
- `motion` which is a real number indicating the distance from the robot to the closest moving object (a positive value  $\geq 0$ ); if there is nothing moving near the robot, then this value is set to the constant `NO_MOTION = -1` (note that you will also need to define this constant);
- `sound`, which is a positive whole number (integer) indicating the volume of any sounds being made near the robot; if there are no sounds, then this value is 0;  
and
- `red`, which is a boolean value indicating if there is anything the color red within the robot's visual range (i.e., true or false)

2. Write a function, as follows:

```
void setTemperature( sensors &s )
```

that initializes the value of the `temperature` field in the argument `s` object to a random number between 32 and 110.

3. Write a function, as follows:  

```
void setMotion( sensors &s )
```

that initializes the value of the `motion` field in the argument `s` object to a random number between `-1` (`NO_MOTION`) and `20`.
4. Write a function, as follows:  

```
void setSound( sensors &s )
```

that initializes the value of the `sound` field in the argument `s` object to a random number between `0` and `10`.
5. Write a function, as follows:  

```
void setRed( sensors &s )
```

that initializes the value of the `red` field in the argument `s` object to either `true` or `false`, set randomly (hint: choose a random number between `0` and `1`, and then use that to set the boolean value).
6. Write a function, as follows:  

```
void readSensors( sensors &s )
```

that calls the above functions (`setMotion()`, `setTemperature()`, `setSound()`, and `setRed()`) to set each of the fields in the argument sensor object `s`. (*1 point*)
7. Write a function, as follows:  

```
void writeSensors( sensors s )
```

that displays on the screen the value of each of the fields in the argument sensor object `s`.
8. Write the `main()` function that:
  - Declares a `sensors` object.
  - Calls `readSensors()`, storing one set of sensor readings.
  - Calls `writeSensors()` to write on the screen all the sensor data that was collected in the previous step.

Compile, build and run your program to make sure it works as you expect it to.

## submission instructions

- You will be submitting ONE file: **bot.cpp**
- Make sure that you have a COMMENT at the top of the file that contains the name of the file, YOUR NAME, "CIS 1.5 PROJECT 6" and the submission date (May 20, 2009).
- The SUBJECT LINE of your email should say: CIS 1.5 PROJECT 6
- The BODY of your email should contain (at least) your name.