Revision - Implementation, Code Smell, Testing

Question 1

1) Consider the following class definition which is syntatically correct but violates programming styles adapted from (Nolle,2012b). Identify which coding style are violated and provide appropriate corrections.

```
class student{

private:

int studentid;

string name, program;

public:

void setStudent(int studentid, string name, string program);

int getstudentid();

string getName();

string getProgram();

};
```

Question 2

Study the following codes provided to you. Answer questions accordingly.

```
try {
    String template = new String(sourceTemplate);

    // Substitute for %CODE%
    int templateSplitBegin = template.indexOf("%CODE%");
    int templateSplitEnd = templateSplitBegin + 6;
    String templatePartOne = new String(
            template.substring(0, templateSplitBegin));
    String templatePartTwo = new String(
            template.substring(templateSplitEnd, template.length()));
    code = new String(reqId);
    template = new String(templatePartOne + code + templatePartTwo);

    // Substitute for %ALTCODE%
    templateSplitBegin = template.indexOf("%ALTCODE%");
    templateSplitEnd = templateSplitBegin + 9;
    templatePartOne = new String(
            template.substring(0, templateSplitBegin));
    templatePartTwo = new String(
            template.substring(templateSplitEnd, template.length()));
    altcode = code.substring(0,5) + "-" + code.substring(5,8);
    out.print(templatePartOne + altcode + templatePartTwo);

} catch (Exception e) {
    System.out.println("Error in substitute()");
}
```

a. Point out the duplications in the code.
b. Discuss your actions in removing the duplication

Question 3

Object-oriented abuse is one of the most common types of software smells. The codes mostly implements object-oriented concepts which is unfortunately incomplete or incorrect. Explain briefly the behaviour of the smells listed below:
a. Switch Statements
b. Temporary Field
c. Refused Bequest

Question 4

For the following function

```
1  int findMax(int a, int b, int c)
2  {
3     int temp;
4     if(a>b)
5        temp=a;
6     else
7        temp = b;
8     if(c>temp)
9        temp = c;
10    return temp;
11
12 }
```

a. Draw the control flow graph for the program from line number 3 to line number 10.
b. Develop test input that will provide the statement coverage.
c. Develop test input that will provide branch coverage.
d. Develop test input that will provide path coverage.
e. Modify the program to introduce a fault so that you can demonstrate that even achieving full path coverage will not guarantee that we will reveal all faults.

Question 5

Draw the control flow graph of the following program and list all the basic path set.

1	void cfg(int x, int y){ int z = 0, i = 0;
2	while(i < y){

3	i = i + 1;
	z = z + x;
	}

4	if(z > y)
5	x = z - y;

6	else
	x = y - z;
	}