Assignment 3 – Part 1

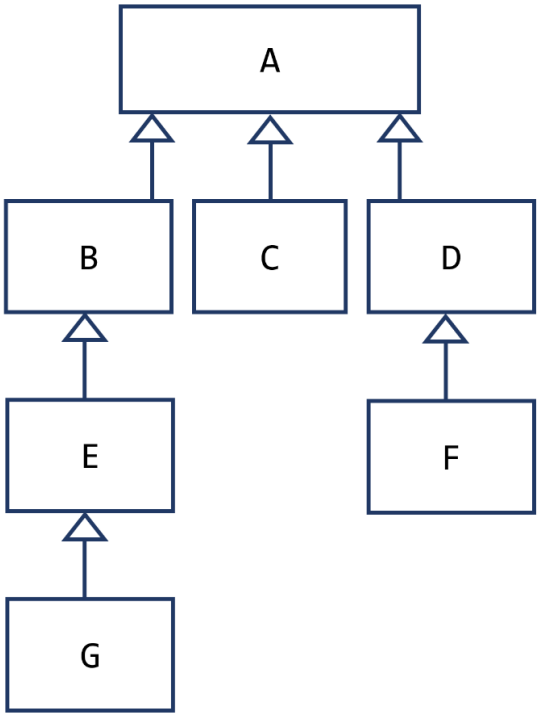
Polymorphism & Pictures

Due: Friday, March 4th at 11:59pm

Submit a single zip file called **`A3-Part1.zip`**.
Part 1 of the assignment has 10 marks.

Q1: Polymorphism [5 marks]

Consider the class hierarchy shown to the right.



Each class in the hierarchy will have the following constructor and overridden toString() method, where X is replaced with the class name.

```
public X(){
   super();
   System.out.print("X");
}

@Override
public String toString(){
   return "X" + super.toString();
}
```

Except that in the `A` class, the constructor is as above, but the toString() should be

```
@Override
public String toString(){
   return "A";
}
```

A) What is displayed to the screen when the following program is run?

```
public static void main(String[] args){
   A[] letters = {new B(),new C(),new D(),new E(),new F(),new G()};
   for(A letter: letters){
      if( !(letter instanceof E) ){
         System.out.print(letter);
       }
   }
}
```

B) Draw a picture of the memory model (stack and heap) at the point in the program above when the stack has the most activation records in it. You can assume that print() does not call any other methods from inside it.

Your solution to both parts (A) and (B) should be in a file called **A3Part1Q1.pdf**. That is, it must be a pdf file.

You can use something like MS Word or Google docs to write your answer for (A). You can draw your memory model for part (B) electronically (Word, PowerPoint, Google Docs, or whatever else you prefer) or draw it by hand (neatly) and take a (good) picture/scan of it and embed it to your assignment. Add your file to your A4-Part1.zip file.

Q2: Drawing [5 marks]

We have reached the half-way point (more or less) in the semester. Think about your experience so far in COMP 1006/1406. Think about what you have learned and what you have done. The joys and frustrations. Think about what you might be able to do with what you have learned. Your task in this problem is to either draw a picture that expresses this reflection or to write about it (or a combination of both). My hope in asking you to do this exercise is that you will critically reflect on what you have learned and perhaps where you would like to take what you have learned forward. It should also make this assignment a bit lighter than the others. **The intention is that this problem should not cause you any stress**. Do not worry about your "artistic ability". You will not be graded on how "artistic" your drawing is or how grammatically correct your writing is. If you put an honest effort into the problem, you will receive full marks. Have fun!

You can create your drawing or writing in any way you wish but you should save it in PDF format. Ideally, the size of your drawing should be a standard letter size in **horizontal orientation** and the length of writing should not be more than one page. Time permitting, we will show your pictures to the class.

If you want your submission to remain private (and not shown to the class) then save your file as **private-name.pdf**, where name is your name. If you agree to have your picture/text displayed (possibly this semester or in future semesters of this course or related courses) then submit your drawing in a file called **public-name.pdf**, where name is your first (given) name. Note: For public submissions, do NOT include your full name/ID in your picture/text unless you are OK with everyone seeing it. Since you are submitting using Brightspace, we already know who you are so we don't need this information in your picture.

Note: Offensive/rude/insensitive submissions will receive zero marks and may be forwarded to the Dean's office depending on the severity. (This has never happened before, and I do not anticipate it happening now.)

Save your program in a file as specified above and add it to your submission zip file.

Recap [A3-Part1.zip]

Submit a single zip file called **`A3-Part1.zip`**. Your zip file should have two (or three) files in it.

- **A3Part1Q1.pdf**
- Either **private-name.pdf** or **public-name.pdf** (or both).

Note: as with the previous assignments, there is a 48-hour grace period. You can submit up until Sunday, March 6th at 11:59pm without penalty. Remember that there are no guarantees of any help over the weekend though, so it is really encouraged that you try to submit without using the grace period.

Note: Part 2 will be posted soon. It will involve implementing the Comparable interface, Abstract classes, Enum classes and inheritance/polymorphism.