Lab 9\_1 - Inheritance

# Part 1:

1. Create a Java project called **Lab9\_1A**
2. Create a secondary class called **Student**. It should have the following:
   1. Five protected instance variables to hold the name (String), grade (int), number of classes taken (int), sum of grade points so far (double), and grade point average (double)
   2. A constructor with no arguments that sets all instance variables to 0 (or their type’s equivalent)

It should print the statement, “Student constructor with no parameters”.

* 1. A constructor with a String and int parameter that will fill in the name and grade and set all others to 0.

It should print the statement, “Student constructor with parameters”

* 1. A String method to return the name (no parameters)
  2. An int method to return the grade (no parameters)
  3. A double method to return the grade point average
  4. A void method that receives an int parameter with a number of classes and a double value with a number of grade points. It should add the parameter values to their corresponding instance variables (number of classes taken & sum of grade points so far).

It should also call the method to recompute the grade point average

* 1. A void method that will recalculate the grade point average. It should be set equal to the sum of grade points so far divided by number of classes taken. (All 3 of these are instance variables.)
  2. A toString method that returns a String with all the instance variables and appropriate labels.

1. Create a new class named **MSTStudent** that extends **Student**. (So MSTStudent will be a subclass of Student.)
2. Add the following new variables and methods to **MSTStudent**
   1. Two private instance variables to hold the project title (String) and grade for the project (double)
   2. A constructor that
      1. Receives parameters for the name, grade, project title, and project grade
      2. Calls the superclass’s constructor by using the **super** command and sending the received name and grade to it as parameters.
      3. Sets the project title and project grade instance variables equal to the corresponding parameters.
      4. Add a print statement that says “MST Student Constructor”
   3. A toString method (overriding the Student class toString method) that returns a String containing all the variables in the **MSTStudent** object with labels (this will include the instance variables from Student too).
   4. A public boolean method called **isMyGPAHigher** that sends another MSTStudent object in as a parameter and returns a false if his gpa is higher than the current student. It returns a true otherwise.
3. Back in the main method:
   1. Declare and instantiate a new **Student** object named **anna**, sending parameters “Anna Heller” and 11.
   2. Declare and instantiate a new **MSTStudent** object named **sally**, sending parameters “Sally Boleyn” and 9, along with a project title and project grade that you decide on.
   3. Declare and instantiate a new **MSTStudent** object named **helen**, sending parameters “Helen Norris” and 10, along with a project title and project grade that you decide on.
   4. Call the method from step 2g for anna sending 8 & 29.00 as parameters.
   5. Call the method from step 2g for sally sending 8 & 32.00 as parameters.
   6. Call the method from step 2g for helen sending 7 & 25.50 as parameters.
   7. Print each student’s information (using the toString method shortcut)
   8. Call **isMyGPAHigher** for sally, sending helen as the parameter. Take the returned value and use it to print a statement saying which one’s grade is higher. (It returns a boolean value, so you’ll need an if-else statement.)