Lab 2

Objectives:
- Sign up for the lab
- Create an array of objects from a text file, array manipulation
- Understand how object is stored in memory
- Submit one file: *GradeManager.java* at the end of the lab. Click the "Submit" button
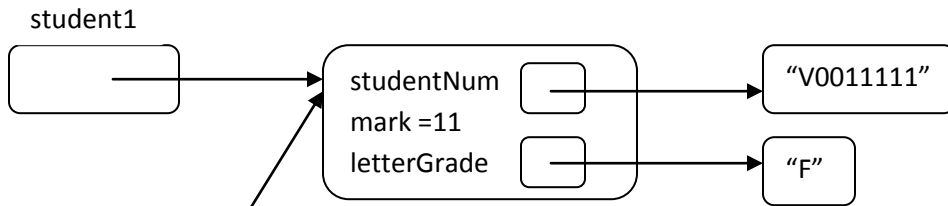
1. Student.java

Download the Student.java file. Since the instance variable "letterGrade" is derived from the instance variable "mark", it is not passed as a parameter to the constructor. The method "calculateLetterGrade()" is a private method. Why? There is no "setLetterGrade()" method? Why? When we design a class, we need to consider many options and tradeoffs.
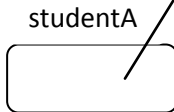
2. Understand how object is stored in memory

```java
1  public class ObjectDemo{
2      public static void change(Student studentA, int i){
3          studentA.setMark(i);
4          System.out.print("\nIn change(), studentA = ");
5          System.out.println(studentA);
6      }
7
8      public static void changeOther(Student studentB, int i){
9          studentB=new Student(studentB);
10         studentB.setMark(i);
11         System.out.print("\nIn changeOther(), studentB = ");
12         System.out.println(studentB);
13     }
14
15     public static void main(String[] args){
16         Student student1=new Student("V0011111",11);
17         System.out.println("In Main, student1 = "+student1);
18         change(student1, 88);
19         System.out.print("\nIn main, after change(), student1 = ");
20         System.out.println(student1);
21         changeOther(student1, 75);
22         System.out.print("\nIn main, after changeOther(), student1 = ");
23         System.out.println(student1);
24     }
25 }
```
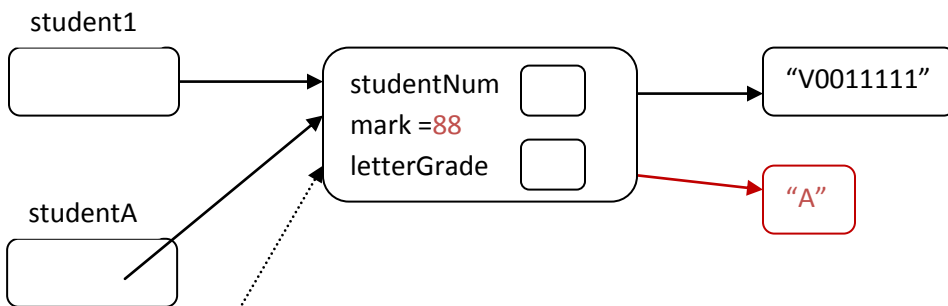
Line 16: create Student object student1 (Student student1=new Student("V0011111",11);)
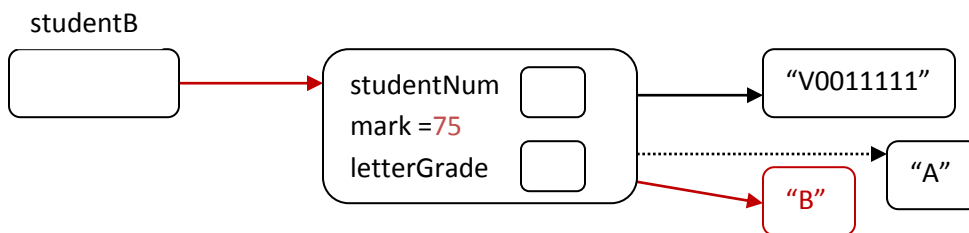
student1

studentNum
mark =11
letterGrade

"V0011111"

"F"

Line 18: method call.(`change(student1, 88);`)

studentA

Note that the value of mark is changed to 88 and the letterGrade is changed to "A". Now the diagram looks like this:

student1

studentNum
mark =88
letterGrade

"V0011111"

"A"

studentA

Line 21: method call (`changeOther(student1, 75);`)

studentB

studentNum
mark =75
letterGrade

"V0011111"

"A"

"B"

Note that initially "studentB" points to what "student1" points to, but after line 9, it points to a different Student object which is a copy of what "student1" points to. Then the value of the copy is changed. What "student1" points to is not.

"studentNum" is a String object, it is passed by reference.

3. GradeManager.java

Download the GradeManager.java file. Arrays of Student objects are used, either as parameters, or as returned values of methods. The arrays in Java are objects, so they are declared using the "new" operator. Since they are objects, they have attributes, such as length.

Notice how an exception is thrown in a static method, how it is handled in the main method.

Notice that the file name is passed from the command line argument, not hard coded in the source file.

Notice how a double number is formatted using printf method.

Learn to use online API for help. http://docs.oracle.com/javase/7/docs/api/

Use Connex to submit one file: *GradeManager.java* at the end of the lab. Make sure you click the "Submit" button.