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| **CS1101 Lab 15 – User-defined Types** |

**Released on: Monday November, 20**   
**Due on: Monday November, 27**  
**How:** submit on Piazza in folder lab15  
**What:** a zipped folder named after you as LastNameFirstName-Lab15.zip, which contains the 4 java files with user-defined types, and the use.java file.

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| In this lab, you will practice **creating user-defined types**.  **In pairs**, you need to create the following types:  1/ Student Records (StudentRecord.java)  2/ Video Games (VideoGame.java)  3/ Houses (House.java)  4/ Bank Accounts (BankAccount.java)  For each of the above cases, identify relevant attributes (the reason why you need the types in the first place) and then write: constructors (at least 3 per type), setters and getters, and a print method.  Each type should be in its own individual file.  You must also create a corresponding main method in a file called use.java. In this file you will create objects of each of these types, set new property values and print some of the object’s values. |

For example, for the StudentRecord.java file, you can have the following attributes as a starting point:

* String name
* Double gpa
* Int utepID
* String major

These are not necessarily the only attributes, but it is a starting point. You can find most of the basic code for this user-defined type class in the file **12-week-activities.pptx**.

In your **use.java** file, you must also do the following for two of the types you defined earlier:

* In the main: Create an array of instances of each these types and print the content of these arrays;
* Outside of the main: Define a method for each type that takes such an array and sorts it (your method does not return anything since the array itself is directly affected in memory)
  + You will have to *define the sorting criterion* for each type of array.
* In the main: Use these two methods on the arrays your created and print the content of the arrays after sorting

**What do you have to turn in?**

A zipped folder named after you as LastNameFirstName-Lab15.zip, containing the following java files:

1/ StudentRecord.java

2/ VideoGame.java

3/ House.java

4/ BankAccount.java

5/ use.java

Each file must be well indented and commented so that the code is very clear. On every file you must include a comment header in which you write the names of both you and your team mate.

**How do I turn it in?**

On piazza, under folder lab15.

**Criteria for grading:**

0/ [10 pts] Your lab is submitted according to specifications

1/ [ 5 pts] Your files should compile and execute without any glitch

2/ [40 pts] Your user-defined types are well-designed, with relevant constructors, attributes, getters, setters, print method (10 pts per user-defined type)

3/ [ 5 pts] Your use.java file creates and uses all your user-defined types

4/ [20 pts] The sorting methods in use.java correctly sort arrays of your user-defined types (10 pts per method)

5/ [10 pts] Your code is well indented

6/ [10 pts] Your code is commented appropriately (think that someone else would use it in the future)