TYPE L202

1. (1p) Given the next code located in the same file, answer the next questions and properly explain your answers: a) After the execution of Line1 does the existing collection store one book? b) Will be **true** printed after the execution of Line2? c) Taking into account that the declared capacity of the collection is 1, does Line3 generate a compilation error? d) Does Line4 generate a compilation error?

```
import java.util.ArrayList;
class Book {
    public boolean equals(Book o) {
        return true; }
}
class P2_1 {
 public static void main(String[] args) {
  final ArrayList<Book> b;
  b = new ArrayList<Book>(1); //Line1
  Book b1 = new Book();
  Book b2 = new Book();

  b.add(b1);
  System.out.println(b.contains(b1)); //Line2
  b.add(b2); //Line3
  b = new ArrayList<Book>(2); //Line4
 }
}
```

2. (0.5p) Given the next code, what is going to be printed out after the execution of Line1? Properly explain your answer.

```
import java.util.ArrayList;
class P2_2 {
 public static void service(
                     ArrayList<String> myArray) {
  myArray.add("Feb20");
  myArray.add("Feb20");
  myArray = new ArrayList<String>();
  myArray.add("Jan20");
  myArray.add("Feb20"); }

 public static void main(String[] args) {
  ArrayList<String> myArray;
  myArray = new ArrayList<String>();

  P2_2.service(myArray);
  System.out.println(myArray); //Line1
 }
}
```

3. (1p) Answer the following questions and motivate the given answers.
a) Should we encourage programmers to declare the type of local variables as being Object. If yes, present the benefits of this approach, otherwise present its drawbacks.
b) What is the interface of an object?
c) Are we allowed to call the toString method for each object we create everywhere in our program?
d) Are we allowed to define inside a class a method having the same name as the class it belongs to that returns a String?

4. (0.5p) Assuming we have the next two classes defined into two separate files belonging to a software system, which condition should be fulfilled in order to make sure the code does not generate compilation errors?

```
class P2_4a {
    protected P2_4a() {}
}
```

```
class P2_4b {
    private P2_4a myObject;
    protected P2_4b() {
        myObject = new P2_4a(); }}
```

5. (1p) What is going to be printed out after the execution of the next main method? Motivate your answer.

```
class P2_5Base {
    private int attributeA;

    public String toString() {
        return "Object value " + attributeA;
    }
}

class P2_5Derived extends P2_5Base {
    private int attributeA;

    public P2_5Derived(int attributeA) {
        this.attributeA = attributeA;
    }

    public static void main(String[] args) {
        P2_5Base object = new P2_5Derived(5);
        System.out.println(object);
    }
}
```

6. (1p) Given the next code defined into a single file, answer the next questions and properly explain your answers: a) What is going to be printed out after the execution of Line1, Line2 and Line3 from the next main method? b) Is it possible to add the next method protected void service3() {} inside P2_6Derived?

```
class P2_6Base {
    public int intAttribute = 25;

    public static String service1() {
        return "Service1 from BaseClass"; }

    public String service2() {
        return "Service2 from BaseClass"; }

    public void service3() {}
}

class P2_6Derived extends P2_6Base {
    public int intAttribute = 55;

    public static String service1() {
        return "Service1 from DerivedClass"; }

    public String service2() {
        return "Service2 from DerivedClass"; }
}
```

```
class P2_6Client {
 public static void main(String[] args) {
     P2_6Base myObject = new P2_6Derived();

     //Line1
     System.out.println(myObject.intAttribute);

     //Line2
     System.out.println(myObject.service1());

     //Line3
     System.out.println(myObject.service2());
   }
}
```

7. (0.5p) What is going to be printed out after the execution of the next main method? Explain your answer.

```
class Book2_7 {
 private String title, author;

 public Book2_7(String author, String title) {
  this.author = author;
  this.title = title; }

 public String toString() throws Exception {
  if (author == null || title == null)
   throw new Exception("Invalid Data");
  return "Author "+author+" Title "+title;
 }
```

```
public static void main(String[] args) {
 Book2_7 b1, b2;
 b1 = new Book2_7(null, "Leaders eat last");
 b2 = new Book2_7("S Sinek", "Leaders eat last");

 try {
  System.out.println(b1.toString());
  System.out.println(b2.toString());
 }
 catch (Exception e) {
  System.out.println(e.getMessage()); }}
}
```

8. (0.5p) Without performing any comparison between the elements of the array defined below print only its unique values. You are allowed to add new code but you are not allowed to write/explicitly use equals or ==.

```
class P2_8 {
    public static void main(String[] args) {
        String[] myStrings = {"OOP", "Java", "OOP", "CTI-EN"}; }}
```

9. (1p) Given the next code, do the commented lines generate compilation errors? Explain your answers!

```
class P2_9 {
    public String myService() { return "MyService"; }
    public static void main(String[] args) {
        int myInt = new Integer(3); //Line1
        System.out.println(myInt.toString()); //Line2
        System.out.println(myService()); //Line3
        args[0] = "000"; //Line4
    }}
```

10. (1p) Present the changes that should be applied inside the methods of P2_10 in order to be able to compile the class.

```
class MyException extends RuntimeException {}
class P2_10 {
    public void myService20() { throw new MyException(); }

    public static void main(String[] args) {
        Object object;
        object.myService20(); }}
```

11. (0.5) How many access specifiers can we set to a local variable? Describe the meaning of each existing type.

12. (0.5) What is a final class? What is a final method?