Unit 7 AP Computer Science A Practice Exam
`ArrayList`

Section I – Multiple Choice
Optional Time – 15 minutes
6 Questions

1) Which of the following are true about `ArrayList`?

I. It is best to use arrays over `ArrayList` when working with less structured data.
II. Programmers may opt to use arrays rather than `ArrayList` to save on space in RAM, as well as if their data has a specific, rigid structure.
III. Arrays are more versatile than `ArrayList` objects.

(A) I only
(B) II only
(C) I and II
(D) II and III
(E) I and III

2) Which of the following code snippets properly creates an `ArrayList` object that will store String objects?

(A)
```
ArrayList stringList = new ArrayList(String);
```

(B)
```
ArrayList stringList<String> = new ArrayList<String>();
```

(C)
```
ArrayList<String> stringList = new ArrayList<String>();
```

(D)
```
ArrayList(String) stringList = new ArrayList(String)();
```

3) Which of the following is the output of the code below?

```
ArrayList<String> myList = new ArrayList<String>();

myList.add("A");
myList.set(0,"B");
myList.add("C");
myList.add("D");
myList.add(2, "E");

System.out.println(myList);
```

(A) [A, B, E, D]
(B) [B, A, E, C]
(C) [B, C, D, E]
(D) [B, C, E, D]

4) Which of the following is the output of the code below?

```
ArrayList<Integer> myList = new ArrayList<Integer>();

myList.add(1);
myList.add(0,2);
myList.remove(1);
myList.add(3);
myList.add(1, 4);

System.out.println(myList);
```

(A) [1, 2, 3]
(B) [1, 2, 4]
(C) [2, 1, 3]
(D) [2, 4, 3]

5) What is accomplished by the loop below?

```
for(int i = 0; i < myList.size(); i+= 2) {
 System.out.println(myList.get(i));
}
```

(A) All elements of `myList` are printed.
(B) Every second element of `myList` are printed.
(C) Every element except the last two elements of `myList` are printed.
(D) There is an error in the code above.

6) Which of the following data types does `ArrayList` NOT support?

(A) int
(B) String
(C) Double
(D) Integer

END OF SECTION I

Section II – Free Response Section

Optional Time – 25 minutes

1 Question

1. This question involves the management of student's assignments that are represented by the following `Assignment` class.

```
public class Assignment
{
   /** Data fields. */
   private String name;

   private String course;

   private int daysUntilDue;

   private String description;

   /** Constructs an Assignment object. */
   public Assignment(String name, String course,
                     int daysUntilDue, String desc)
   { /* implementation not shown */ }

   /** Returns the value of the name field. */
   public String getName()
   { /* implementation not shown */ }


   /** Returns the value of the course field. */
   public String getCourse()
   { /* implementation not shown */ }


   /** Returns the value of the daysUntilDue field. */
   public int geDaysUntilDue()
   { /* implementation not shown */ }


   /** Returns the value of the description field. */
   public String getDescription()
   { /* implementation not shown */ }

}
```

You will implement two methods of the `Agenda` class.

```
public class Agenda
{

    /** List of assignment objects, initialized by the constructor.*/
    private ArrayList<Assignment> assignments;


    /** Constructs an Agenda object. */
    public Agenda()
    { /* implementation not shown */ }


    /** Adds an assignment to the assignments list.
     */
    public void addToAgenda(Assignment assignment)
    { /* to be implemented in part (a) */ }


    /** Removes an assignment from the assignments list based on inputted name.
     *  Precondition: All assignments have a unique name – No duplicate names.
     */
    public void removeAssignment(String name)
    { /* to be implemented in part (b) */ }


}
```

(a) Write the `Agenda` method `addToAgenda`. This method will add an `Assignment` object to the `assignments` list, in order based on the `daysUntilDue` field value of the `Assignment`.

NOTE: Assume the `assignments` list is already sorted by the `daysUntilDue` field value.

For example, if the assignments list was initialized to the following:

```
{
 Assignment("SampleName1", "APCS", 6, ""),
 Assignment("SampleName2", "APCS", 8, ""),
 Assignment("SampleName3", "APCS", 9, ""),
}
```

If we run `addToAgenda`
`(Assignment("SampleName4", "APCS", 7, ""));`

The list should change to the following:

```
{
 Assignment("SampleName1", "APCS", 6, ""),
 Assignment("SampleName4", "APCS", 7, ""),
 Assignment("SampleName2", "APCS", 8, ""),
 Assignment("SampleName3", "APCS", 9, ""),
}
```

If we then run `addToAgenda`
`(Assignment("SampleName5", "APCS", 8, ""));`

The list should change to the following:

```
{
 Assignment("SampleName1", "APCS", 6, ""),
 Assignment("SampleName4", "APCS", 7, ""),
 Assignment("SampleName5", "APCS", 8, ""),
 Assignment("SampleName2", "APCS", 8, ""),
 Assignment("SampleName3", "APCS", 9, ""),
}
```

In the case where the daysUntilDue are equal, the new item will be added before the already existing entries with that value.

Class information for this question

```
public class Assignment

private String name;
private String course;
private int daysUntilDue;
private String description;

public Assignment(String name, String course,
                  int daysUntilDue, String desc)
public String getName()
public String getCourse()
public int geDaysUntilDue()
public String getDescription()

public class Agenda

private ArrayList<Assignment> assignments;

public Agenda()
public void addToAgenda(Assignment assignment)
public void removeAssignment(String name)
```

Complete the `addToAgenda` method below.

```
/** Adds an assignment to the assignments list.
 */
public void addToAgenda(Assignment assignment)
```

(b) Write the `Agenda` method `removeAssignment`. This method will remove an `Assignment` object from the `assignments` list that has the same name as the input parameter.

For example, if the assignments list was initialized to the following:

```
{
 Assignment("SampleName1", "APCS", 6, ""),
 Assignment("SampleName2", "APCS", 8, ""),
 Assignment("SampleName3", "APCS", 9, ""),
}
```

If we run `removeAssignment("SampleName2");`

The list should change to the following:

```
{
 Assignment("SampleName1", "APCS", 6, ""),
 Assignment("SampleName3", "APCS", 9, ""),
}
```

Class information for this question

```
public class Assignment

private String name;
private String course;
private int daysUntilDue;
private String description;

public Assignment(String name, String course,
                  int daysUntilDue, String desc)
public String getName()
public String getCourse()
public int geDaysUntilDue()
public String getDescription()

public class Agenda

private ArrayList<Assignment> assignments;

public Agenda()
public void addToAgenda(Assignment assignment)
public void removeAssignment(String name)
```

Complete the `removeAssignment` method below.

```
/** Removes an assignment from the assignments list based on inputted name.
 *  Precondition: All assignments have a unique name – No duplicate names.
 */
public void removeAssignment(String name)
```

END OF SECTION II