

## A2 (20 marks)

*Focus: variables, data types, constants, reading input from the keyboard*

Q1. [4 marks] Through a simple equation it is possible to obtain the acceleration of an object using the change in velocity and time.

$$a = \frac{v_1 - v_0}{t}$$

Write a program that requests from the user the starting velocity  $v_0$ , the final velocity  $v_1$ , and the time  $t$  to calculate the average acceleration.

Sample run:

```
Enter v0, v1, and t: 3 30.4 1.5
The average acceleration is 18.266666666666666
```

Q2. [5 marks] Create a program that can calculate the cost of a road trip using fuel cost, distance travelled and fuel economy.

Sample run:

```
Enter the driving distance in miles: 155
Enter miles per gallon: 23.5
Enter price in $ per gallon: 5.2
The cost of driving is $34.297872340425535
```

Q3. [5 marks] You are required to create a program that can compute the distance between two specified points,  $(x_1, y_1)$  and  $(x_2, y_2)$ . The formulae to find this distance is

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

You can complete this problem using the Java method `Math.sqrt(a)` to compute  $\sqrt{a}$

Sample run:

```
Enter x1 and y1: 1 3.5
Enter x2 and y2: 2.1 4.5
The distance of the two points is 1.4866068747318506
```

Q4. [6 marks] Create a program that can calculate the area of a triangle using the following formulae

$$s = (side1 + side2 + side3)/2$$
$$area = \sqrt{s(s - side1)(s - side2)(s - side3)}$$

To calculate the length of each side, ask the user to inputs the points (x and y) representing the extremities of the triangle and use your program made in question 3 to calculate the length of each side of the triangle.

Sample run:

```
Enter three points for a triangle.  
(x1, y1):0 0  
(x2, y2):5 0  
(x3, y3):0 5  
The area of the triangle is 12.5
```

### Submission Instructions

For this assignment, you need to do the following:

1. Create a Java project of which name consists of **your student number followed by the assignment number**, e.g., “1234567\_A2”.
2. Create one class for each question and write your answer inside that class. Your classes should have the same name as the question number (e.g., Q1)
3. After solving all questions, open Windows Explorer (or any other file explorer).
4. Navigate to your Java project folder (can be found inside your Eclipse workspace folder).
5. Locate the “src” folder for this project (the folder that includes the source code for all questions).
6. Zip the “src” folder and rename the zipped file to match your project name (e.g., 1234567\_A2.zip).
7. Submit the zipped file to **Canvas**.

Note that you can resubmit an assignment, but the new submission overwrites the old submission and receives a new timestamp.