

Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
200 level 1st Semester Examination – May/July 2017
CST224-2 Programming II



Part B - Practical

Instructions to candidates

Duration: Two (02) hours

Number of questions: Four (04)

Implement all questions

Mark allocation: 60

Save your programs separately in a folder with your examination number, compress it and upload to the CMS

1.

- a. Write a Java programme to get the weight of a person in kilograms and height in meters as user inputs. Calculate and display the Body Mass Index (BMI) using the following formula.

$$BMI = \frac{\text{weightInKilograms}}{\text{heightInMeters} * \text{heightInMeters}}$$

(5 mark)

- b. Modify the above programme to display the appropriate message according to their BMI as given bellow.

BMI	Message
less than 18.5	Underweight
between 18.6 and 24.9	Normal
between 25 and 29.9	Overweight
30 or greater	Obese

(10 mark)

2.

- a. Write a Java programme to initialize an array called **numbers** as given bellow.

`numbers = {12, 2, 6, 9, 1, 7, 20, 5, 10, 4, 15}`

(4 mark)

- b. Modify the programme to let the user to enter a number. If the number entered by the user exists in the array, your programme should display the index of the element with a message saying, "Number exists in the array". If the number does not exist then your programme should display "Number does not exist in the array".

(5 mark)

- c. Implement a new Java method called `sort()` to sort the above array and display the sorted array on the screen.

(6 mark)

3. Write a Java programme to perform the following requirements. The class diagram of the programme is given in figure 01.

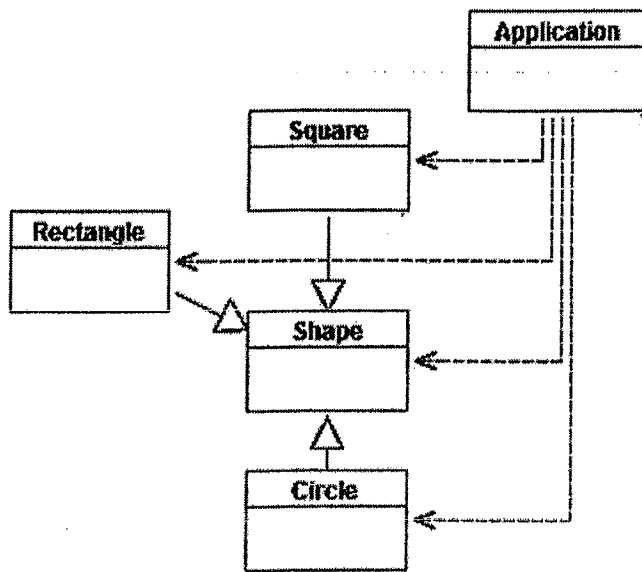


Figure 01: Class diagram of the programme

- a. Create a Java class called *Shape* with the following fields and methods.

Field (type)	Method
length (double)	void display(double a)
Width (double)	double calcArea()

(2 mark)

- b. Implement three (03) subclasses called *Rectangle*, *Square* and *Circle* from *Shape* class using the details given bellow. Override *calcArea()* method using the formula given in the table.

Class	Constructor	Method	Formula
Rectangle	Rectangle(double , double)	double calcArea()	length x width
Square	Square(double)	double calcArea()	length x length
Circle	Circle(double)	double calcArea()	$(22/7) \times \text{radius} \times \text{radius}$

(8 mark)

- c. Implement a drive class called *Application* to calculate and display the area of each shape according to the following parameters. You may use object-oriented techniques where necessary.

Shape	Parameters
Rectangle	12, 10
Square	15
Circle	14

(5 mark)

4. Write a Java programme to perform the following requirements. You may use object-oriented techniques where necessary.

a. Implement three (03) Java interfaces called Printer, Plotter and Monitor.

i. Printer interface has two (02) abstract methods with single integer parameter in each namely `print(int a)` and `getPages(int b)` where `getPages(int b)` returns an integer while `print(int a)` returns nothing.

ii. Plotter and Monitor interfaces have single abstract method in each called `plot()` and `display()` respectively. Neither of them are returning any value nor accepting any parameter.

(6 mark)

b. Implement a Java concrete class called Demo using the three (03) interfaces you created in part a. where `plot()` displays a message: "Plotting...", while `display()` displays a message: "Displaying...", on the screen.

(2 mark)

c. Implement `getPages(int b)` method so that it accepts the number of pages to be printed as a parameter and returns the same while displaying a message (or set of messages) saying "Printing... 1 out of b pages"; where b is the total number of pages to be printed.

(2 mark)

d. Implement `print(int a)` method to accept the total pages to be printed and display the message "b pages printed".

(2 mark)

e. Implement `main()` method to call `plot()`, `display()`, `getPages()` and `print()` methods.

(3 mark)