



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(ONLINE)
SEMESTER I
SESSION 2020/2021**

COURSE NAME : OBJECT ORIENTED PROGRAMMING
COURSE CODE : BIC 20904
PROGRAMME CODE : BIS / BIP / BIW / BIM
EXAMINATION DATE : JANUARY / FEBRUARY 2021
DURATION : 3 HOURS
INSTRUCTION : 1. ANSWER ALL QUESTIONS.
2. THE STUDENTS SHOULD
UPLOAD THE ANSWER
BOOKLET (PDF FORMAT)
WITHIN 30 MINUTES AFTER
EXAMINATION PERIOD.

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THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1** Answer **Q1(a)**-**Q1(b)** using Java based on the formulas for calculating the volume of the shapes given in **FIGURE Q1**.

Volume of a cylinder: $\text{Volume} = \pi r^2 h$

Volume of a cuboid: $\text{Volume} = \text{length} \times \text{width} \times \text{height}$

where π is `Math.PI`, r is the radius, h is the height

FIGURE Q1

- (a) Write a class named `Volume` that has two (2) overloaded static methods for calculating the volume of two (2) 3D shapes: cylinder, and cuboid. Implement the methods in a complete class. (9 marks)
- (b) Write a class named, `TestVolume` to use the overloaded static methods written for **Q1(a)**. The class shall display the volume for each of the 3D shapes mentioned in **FIGURE Q1**. (6 marks)

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Q2 Answer **Q2(a)**-**Q2(c)** using Java based on the information given in **FIGURE Q2**.

The BinaPaint Company has asked you to write a program that calculates the price of painting for rectangular walls. To calculate the price, you multiply the area of the wall (length times width) by the price per square metre of wall.

For example, the area of wall that is 15 metres long and 12 metres wide is 180 square metres. To paint that wall that costs RM20 per square metre would cost RM3,600.00 ($15 \times 12 \times 20 = 3,600$)

You are required to apply three classes: `WallDimension`, `WallPaint`, and `PaintCalculator`. The `PaintCalculator` contains the main method that will apply `WallDimension` and `WallPaint` classes. The following UML diagram shows possible class design and the relationships between the `WallDimension` class and `WallPaint` class.

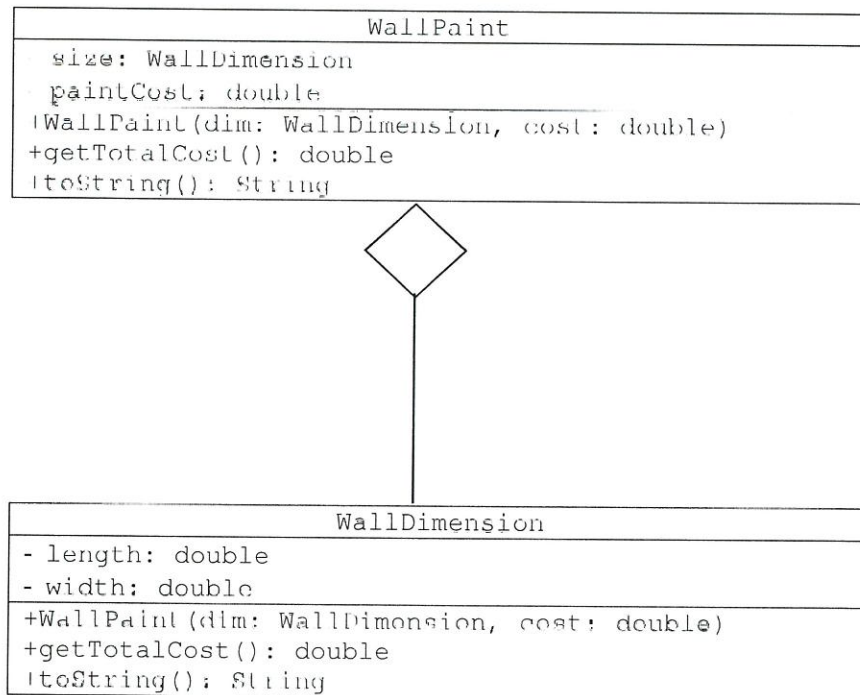


FIGURE Q2

- (a) Write a class named `WallDimension` that has two fields: one for the length of the wall and one for the width. The `WallDimension` class should have a method that returns the area of the wall. The area of the wall is the wall's length multiplied by the wall's width.

(15 marks)

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- (b) Write a class named `WallPaint` that has a `WallDimension` object as a field. The `WallPaint` class should also have a field for the cost of the wall per square metre. The `WallPaint` class should have a method that returns the total painting cost of the wall. (15 marks)
- (c) Write an application class, namely `PaintCalculator` that will use the classes implemented for **Q2(a)** and **Q2(b)**. Prompt the user to enter the dimensions of a wall and the price per square metre of the desired painting. The application should display the total painting cost of the wall. (15 marks)

Q3 Answer **Q3(a)**-**Q3(b)** using Java based on the information given in **FIGURE Q3**.

- A `Ship` class has the following members:
- A field for the name of the ship (a string)
 - A field for the year that the ship was built (a string)
 - A constructor and appropriate accessors and mutators
 - A `toString` method that displays the ship's name and the year it was built
- A `CruiseShip` class is derived from the `Ship` class. The `CruiseShip` class should have the following members:
- A field for the maximum number of passengers
 - A constructor and appropriate accessors and mutators
 - A `toString` method that overrides the `toString` method in the base class. The `toString` method in the `CruiseShip` class should display only the ship's name and the maximum number of passengers.

FIGURE Q3

- (a) Write the `Ship` class using Java. (16 marks)
- (b) Write the `CruiseShip` class using Java. (14 marks)

- END OF QUESTIONS -

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