SCHOOL OF COMPUTER SCIENCES
UNIVERSITI SAINS MALAYSIA
Semester II Session 2023/2024

Tutorial CPT113
Topic: Introduction to Object-Oriented

Learning Outcomes:

- Doing basic OO Programming
- Building UML Diagram

1. Build a class object called `Student` with the following information:
   `name`
   `ID`
   `desasiswa`
   `year`
   `sem`
   `CGPA`
   Write appropriate accessor and mutator and display methods/functions. Complete the main function to test all the members declared in class `Student`.

2. Write a program of `Line` class that have a constructor of Line() to assign the length of the line and return length to the class.

3. Write a program, creating 3 `Rectangle` object named `kitchen`, `bedroom` and `den`. Calculate the total area of the three room. Measure, it should have a
   a) class declaration
   b) function to set `length` and `width`, `getArea` function and
   c) display the total area of three room.

4. Design a class called Date. The class should store a date in three integers: month, day, and year. There should be member functions to print the date in the following forms:

   31/3/2022
   March 31, 2022
   31 March 2022

   Demonstrate the class by writing a complete program implementing it.
   Input Validation: Do not accept values for the day greater than 31 or less than 1. Do not accept values for the month greater than 12 or less than 1.

5. Create a class named Instructor. It contains a first_name, last_name, and an office_number, and its only constructor requires all three as arguments. Create a class named Classroom. It contains a building_number and a room_number, and its only constructor requires both as arguments.

   Each of these classes contains a function that displays an object's values. Draw the UML diagram of the Instructor class and Classroom class.

6. The owner of a small delivery company plans to have an information system that allows him to save data about his customers and deliveries. After some time studying the problem, he reached the following requirements:
   - Each customer has a VAT number, a name, a phone number and an address. There are no two clients with the same VAT number.
   - When a customer wants to send a package to another customer, he just has to login to the company website, select the customer he wants to send the package to, enter the package's weight and if the delivery is normal or urgent. He then receives a unique identifier code that he writes on the package.
   - The package is then delivered by the customer at the delivery centre of his choosing. A delivery centre has a unique name and an address.
   - Each client has an associated delivery centre. This delivery centre is chosen by the company and it is normally the one closest to the customer's house.
   - The package is them routed through an internal system until it reaches the delivery centre of the recipient.
   - The package is then delivered by hand from that delivery centre to the recipient by a courier.
   - Couriers have a single VAT number, a name and a phone number. Each courier works in a single delivery centre.
   - A courier is assigned to a packet as soon as the packet is introduced in the system.

Design an UML (Unified Modelling Language) diagram based on this scenario.