**Practical 4 (Part A)**

**Part A (Selection Control Structure)**

1. A program is required to read a customer’s name, a purchase amount and a tax code. The tax code has been validated (other code is not allowed) and will be one of the following:

|  |  |  |
| --- | --- | --- |
| **Code** | **Description** | **Percentage** |
| 0 | Tax exempt | 0% |
| 1 | Government service tax only | 6% |
| 2 | Service charge only | 10% |
| 3 | Government service tax and service charge | 16% |
| 4 | Goods and services tax only (GST) | 6% |

The program must then compute the sales tax and the total amount due, and print the customer’s name, purchase amount, sales tax (or charge) and the total amount due.

Given the algorithm (in **Pseudocode**) below, write a C++ program accordingly.

START

1. Variable definition and initialization
2. Read cust\_name, purch\_amt, tax\_code
3. Case of tax\_code:

0: sales\_tax = 0

1 or 4: sales\_tax = 0.06 \* purch\_amt

2: sales\_tax = 0.10 \* purch\_amt

3: sales\_tax = 0.16 \* purch\_amt

End case

1. total\_amt = purch\_amt + sales\_tax
2. Print cust\_name, purch\_amt, sales\_tax, total\_amt

END

1. Design an algorithm (with a **Pseudocode**) for the following table to decide the activity based on outdoor temperature. Then write a C++ program accordingly.

|  |  |
| --- | --- |
| **Activity** | **Temperature** |
| Swimming | 85 |
| Tennis | 70 85 |
| Golf | 32 |
| Skiing | 0 |
| Dancing |  |

1. Design an algorithm in **Pseudocode** and write a C++ program that receive three integers as the input and print the sum, product, average, smallest and largest of these numbers.
2. You are required to develop a program that calculates the overtime pay of the staff in ABC Company. Each staff is required to work 40 hours per week. For each extra hour they work, they will be given additional 50% of their hourly wages as overtime payment. For example, the hourly wages of John is RM55.00. He has worked for 46 hours this week. Therefore his total wages for this week is as follows:

46\*55.0 + 55.0\*(6\*0.5) = 2530.00+ 165.00 = RM2695.00

Write a C++ program that asks the user to enter their hourly wage and the number of hours they worked. Then report their weekly salary, taking into account overtime pay for any hours over 40. An example is shown below. Note the output shows "RM2695.00" and not "RM2695".

Enter hourly wage: 55

Enter hours: 34

You have earned RM1870.00.

You are underworked.

Enter hourly wage: 55

Enter hours: 46

You have earned RM2695.00

Display this if hours < 40

Remark: You shall appropriately use at least one **constant** in your program.

1. You are required to design an algorithm (in **Pseudocode**) and write a C++ program that determines whether a meeting room is in violation of fire law regulations regarding the maximum room capacity.

The program will read in the maximum room capacity and the number of people attends the meeting. If the number of people is less than or equal to the maximum room capacity, the program announces that it is legal to hold the meeting and tells how many additional people may legally attend. If the number of people exceeds the maximum room capacity, the program announces that the meeting cannot be held as planned due to fire regulations and tells how many people must be excluded in order to meet the fire regulations.

1. You are required to write two different C++ programs. Each will accept the monthly sales figure of a salesperson and able to calculate his/her monthly income using the following commission schedule. Draw the **flowchart** using the following structures and then write the C++ program accordingly: (i) Nested if (ii) multi-way if-else

|  |  |
| --- | --- |
| **Monthly Sales** | **Income** |
| Greater than or equal to RM50000 | RM375 plus 16% of monthly sales |
| Less than RM50000 but  greater than or equal to RM40000 | RM350 plus 14% of monthly sales |
| Less than RM40000 but  greater than or equal to RM30000 | RM325 plus 12% of monthly sales |
| Less than RM30000 but  greater than or equal to RM20000 | RM300 plus 9% of monthly sales |
| Less than RM20000 but  greater than or equal to RM10000 | RM250 plus 5% of monthly sales |
| Less than RM10000 | RM200 plus 3% of monthly sales |

1. Write a **switch** statement that will examine the value of an **integer** variable called **flag** and print one of the following messages, depending on the value assigned to flag.
2. **HOT**, if **flag** has a value of **1**,
3. **WARM**, if **flag** has a value of **2**,
4. **COLD**, if **flag** has a value of **3**,
5. **OUT OF RANGE**, if **flag** has any other value.
6. Write a **nested** **switch** statement that will examine the value of a **char**-typed variable called **colour** and print one of the following messages, depending on the character assigned to colour.
   1. **“RED”**, if either **r** or **R** is assigned to **colour**. Then prompt the user to enter the level (integer-typed). Print “Caution” if the level is 1, “Dangerous” if the level is 2, “Critical” if the level is 3, “Invalid” if it is other value.
   2. **“GREEN”**, if either **g** or **G** is assigned to **colour**,
   3. **“BLUE”**, if either **b** or **B** is assigned to **colour**,
   4. **“BLACK”**, if **colour** is assigned any other character.