

**University of Mauritius**  
**Faculty of Engineering**  
**Department of Computer Science & Eng.**  
**CSE 1017Y – Software Programming**  
**2015/2016- Semester 1**

**Labsheet 4 - Decision Structures (Part 2)**

**Question 1**

A swimming club charges a fee per swimming session. If, for members, it charges a fee  $x$  per session per adult and  $y$  per child, for non-members, the charges will be  $2x$  per adult and  $1.5y$  per child. If the head of a family is a member, the whole family is charged as members. Write a program that performs the calculation for the fee to be charged to a family. The program should allow as inputs the values of  $x$  and  $y$ , the number of adults and number of children and whether they should be charged as members or non-members.

**Question 2**

A company pays its workers on a weekly basis, based on number of years of service and number of hours worked in the week as follows:

- Workers having a minimum of 15 years of service are paid Rs 200 per hour for the 1<sup>st</sup> 40 hours and Rs 300 per hour for up to another 20 hours.
- Other workers are paid at Rs 150 per hour for the first 45 hours and Rs 250 per hour for up to another 15 hours.

Write a program that allows as input the number of years of service of a worker and the total number of hours worked in a week and displays the total salary earned by the worker for the week. Workers cannot work in the company for more than 30 years and they cannot work for more than 60 hours in a week. Your program should display appropriate error messages in case of unreasonable data being input.

### Question 3

A country calculates annual income-tax payable, by an income earner, as follows:

- A salary earner is allowed a personal allowance (not taxable) depending on number of dependants, as per the table below. A person is allowed to claim for up to three dependants.

Number of Dependants	Personal Allowance (Rs)
0	255000
1	325000
2	395000
3	455000

- From his/her annual salary, the personal allowance is deducted.
- On the remaining amount, the income tax is calculated as follows:

Remaining Amount	% Income Tax
First 50000	15 %
Next 70000	20 %
Remaining Amount	25%

Write a program that allows as input the annual income of a person and outputs the tax payable by the person.

### Question 4.

A utilities company supplies electricity to consumers based on three possible tariffs as shown in the table below. Consumers are free to choose their tariffs based on number and type of appliances they wish to support. Each tariff also has a monthly minimum charge.

Tariff Number	Minimum Charge (Rs)	Charges Per Unit (Rs)			
		First 25	Next 50	Next 75	Remaining
110	44.00	2.75	3.25	4.00	6.50
120	184.00	3.00	3.50	4.25	6.00
140	360.00	3.25	3.75	4.50	5.75

Write a program that allows the input of the tariff chosen by a consumer and the number of units consumed, in a month, and outputs the total amount the consumer has to pay for that month.

### Question 5

A company provides free cars to its higher-level employees. The engine capacity of the car depends on the salary and number of years of service. Employees can also opt for a monthly car allowance in lieu of the free car facility. The criteria for eligibility are as per the following table:

Salary (Rs)	Minimum Number of years of Service	Car Engine Capacity (cc)	Optional car allowance
75000	-	2000	10000
60000	-	1800	8000
50000	10	1800	8000
50000	-	1600	6000
40000	20	1500	5000
30000	25	1400	4000

Write a program that allows as input the number of years of service of an employee and his salary. The program should display whether the employee is eligible for a free car, the engine capacity of the car and the optional car allowance.

Note: No employee of the company earns less than Rs 5000 or more than Rs 100,000. Your programs should check for these and display an error accordingly.

### Question 6

A company sells 5 different types of cars. Type 1 is a car of 1500 CC, Type 2 is 1500 CC with automatic mirrors, type 3 is 1500 CC with automatic mirrors and front and rear sensors. Type 4 is 1200 CC while type 5 is 1200 CC with automatic gear. Write a program that allows the input of a type of car between 1 and 5 (inclusive) and it displays the details of the car. Use **switch** statements.