# Informatics Institute of Technology

# 4COSC006C: Programming Principles 01

# Tutorial 2 – Flowcharts (Sequence & Selection)

1. Draw a flowchart to read three positive integers and to determine the largest and print it on the screen.

2. A car rental agency charges $34.50 per day for a particular vehicle. This amount includes up to 75 miles free. For every additional mile, the customer must pay $0.25. Design an algorithm using flowcharts to compute the total amount to pay. Use the number of days and the total miles driven by the customer as the input values.

3. Represent the algorithm using a flowchart that obtains a number representing a month (January = 1, December = 12) and outputs what season the month is in. For the purpose of this program, December-March is considered winter, April-May is considered spring, June-August is considered summer, and September-November is considered autumn.

4. Write the algorithm for a program that calculates the areas of different geometrical figures. The program should display menu as below:
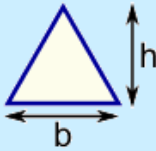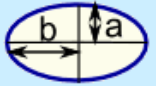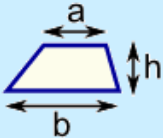
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| GEOMETRICAL FIGURE  |
|     CALCULATIONS    |
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| Figure:             |
| 1. Circle           |
| 2. Triangle         |
| 3. Ellipse          |
| 4. Trapezium        |
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| Type number desired |
|                     |
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After choosing the option program should ask the user for the data required (height, width, radius etc.) to calculate the area. Program displays the resulting area of the figure based on entered data.

Formulas for calculating the areas:

| Triangle | | Circle |
|---|---|---|
|  Area = ½ × b × h<br>b = base<br>h = vertical height |  | Area = π × r² <br>Circumference = 2 × π × r<br>r = radius |
|  Ellipse<br>Area = πab |  | Trapezoid (US)<br>Trapezium (UK)<br>Area = ½(a+b) × h<br>h = vertical height |

Note: **h** is at right angles to **b:** 

5. Design an algorithm for a program to receive an positive integer as the year, and to determine whether it is a leap year.

6. A program is required by a company to <u>read</u> an employee's number, pay rate and the number of hours worked in a week. The program is then to <u>validate</u> the pay rate and the hours worked fields and, if valid, compute the employee's weekly pay and print it along with the input data.

   Validation: According to the company's rules, the maximum hours an employee can work per week is 60 hours, and the maximum hourly rate is $25.00 per hour. If the hours worked field or the hourly rate field is out of range, the input data and an appropriate message is to be printed and the employee's weekly pay is not to be calculated.

   Weekly pay calculation: Weekly pay is calculated as hours worked times pay rate. If more than 35 hours are worked, payment for the overtime hours worked is calculated at time-and half.