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Department of Computer Science & Engineering

# Lab Assignment - 05

Course Name: Programming C
Course Code: CSC-184

**Submitted To:**

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**Question 1:**Write a program to check whether a triangle is valid or not . If the triangle is valid then check whether the triangle is equilateral, isosceles or scalene.

**Objective:**

Write a program to check if a triangle is valid or not. If valid, further classify the triangle as equilateral, isosceles, or scalene.

**Algorithm:**

Step1- start.

Step 2- Input: Sides a, b, c.

Step 3- Check validity:

Ensure a + b > c, b + c > a, and a + c > b.

Step 4- Classify:

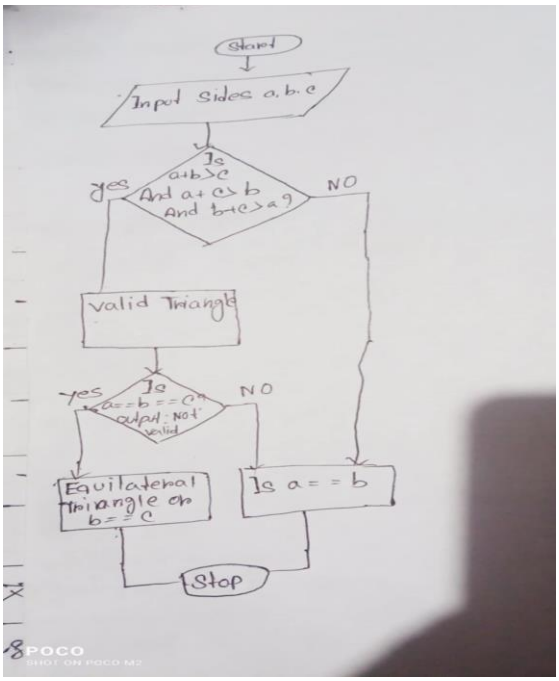
If a == b == c: Equilateral.

If a == b or b == c or a == c: Isosceles.

Else: Scalene.

Step 5- Stop.

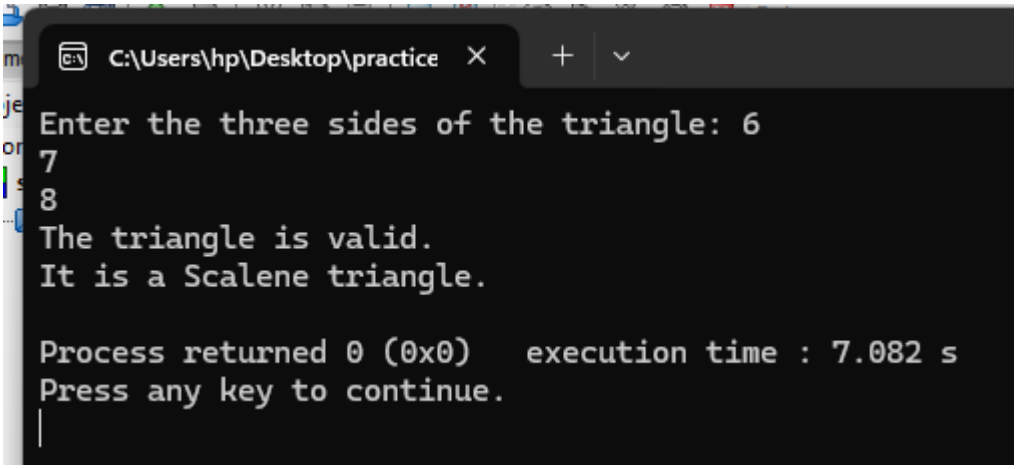
**Flowchart:**



**Code:**

```c
#include <stdio.h>

void checkTriangle(int a, int b, int c) {

    if (a + b > c && a + c > b && b + c > a) {
        printf("The triangle is valid.\n");


        if (a == b && b == c) {
            printf("It is an Equilateral triangle.\n");
        } else if (a == b || b == c || a == c) {
            printf("It is an Isosceles triangle.\n");
        } else {
            printf("It is a Scalene triangle.\n");
        }
    } else {
        printf("The triangle is not valid.\n");
    }
}

int main() {
    int a, b, c;
    printf("Enter the three sides of the triangle: ");
    scanf("%d %d %d", &a, &b, &c);

    checkTriangle(a, b, c);

    return 0;
}
```

**Output:**




**Question 2:** Write a program where user will select the operator and that specific operation will be executed only.

**Objective:**

The objective of the program is to demonstrate basic functionality of condition-based execution, user input handling, and arithmetic operations.

**Algorithm:**

Step 1- Start.

Step 2- Display operators (+, -, *, /).

Step 3- Input operator from user.

Step 4- Validate operator:

If valid, proceed; else ask again.

Step 5- Input two numbers.

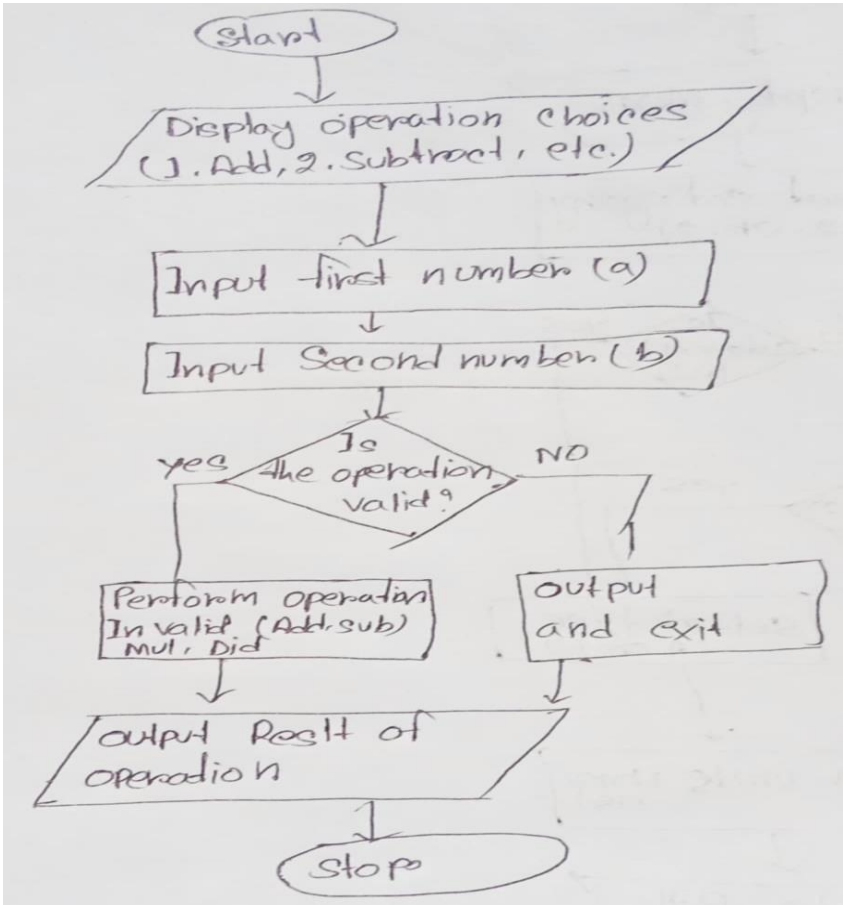
Step 6- Perform operation based on operator (+, -, *, /).

Step 7- Display result.

Step 8- Ask for another calculation. If yes, repeat from step 3; if no, exit.

Step 9- End.

**Flowchart:**



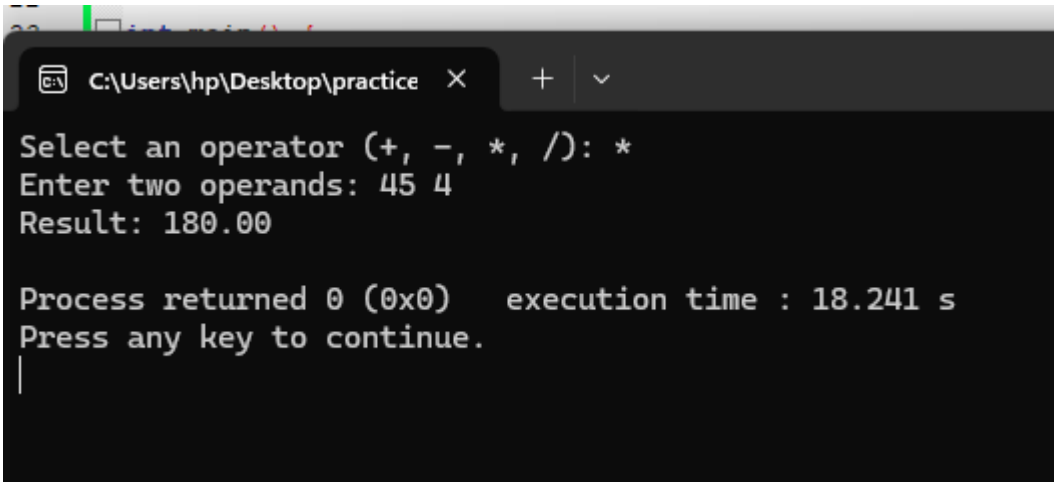
**Code:**

in.c

```c
#include <stdio.h>

void add(double a, double b) {
    printf("Result: %.2lf\n", a + b);
}

void subtract(double a, double b) {
    printf("Result: %.2lf\n", a - b);
}

void multiply(double a, double b) {
    printf("Result: %.2lf\n", a * b);
}

void divide(double a, double b) {
    if (b != 0) {
        printf("Result: %.2lf\n", a / b);
    } else {
        printf("Error: Division by zero!\n");
    }
}

int main() {
    char operator;
    double num1, num2;

    printf("Select an operator (+, -, *, /): ");
    scanf(" %c", &operator);
    printf("Enter two operands: ");
    scanf("%lf %lf", &num1, &num2);

    switch (operator) {
```

```c
    }
}

int main() {
    char operator;
    double num1, num2;

    printf("Select an operator (+, -, *, /): ");
    scanf(" %c", &operator);
    printf("Enter two operands: ");
    scanf("%lf %lf", &num1, &num2);

    switch (operator) {
        case '+':
            add(num1, num2);
            break;
        case '-':
            subtract(num1, num2);
            break;
        case '*':
            multiply(num1, num2);
            break;
        case '/':
            divide(num1, num2);
            break;
        default:
            printf("Invalid operator!\n");
            break;
    }

    return 0;
}
```

**Output:**




**Question 3:** Write a program to check whether the given input is a digit, alphabet or special characters.

**Objective:**

The program should identify whether the input is a digit, an alphabet, or a special character and output the corresponding result.

**Algorithm:**

1. Start
2. Take input from the user.
3. Check if input is a digit:

If the input is a digit (using input.isdigit()), print "The input is a digit."

4. Check if input is an alphabet:

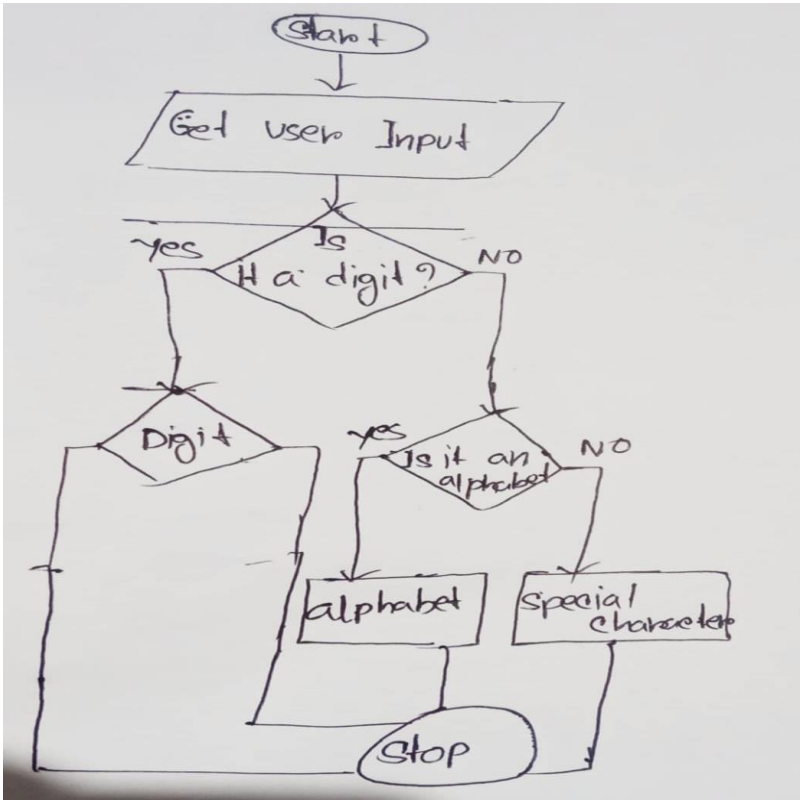
If the input is alphabetic (using input.isalpha()), print "The input is an alphabet."

5. Check if input is a special character:

If the input is neither a digit nor an alphabet (i.e., not a number or letter), print "The input is a special character."

6. End.

**Flowchart:**

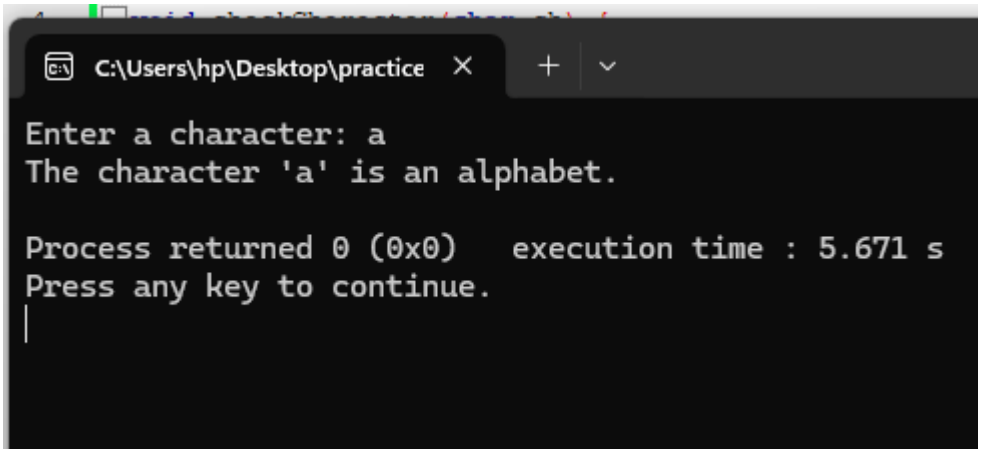



**Code:**

*main.c

```c
#include <stdio.h>
#include <ctype.h>

void checkCharacter(char ch) {
    if (isalpha(ch)) {
        printf("The character '%c' is an alphabet.\n", ch);
    } else if (isdigit(ch)) {
        printf("The character '%c' is a digit.\n", ch);
    } else {
        printf("The character '%c' is a special character.\n", ch);
    }
}

int main() {
    char ch;
    printf("Enter a character: ");
    scanf(" %c", &ch);

    checkCharacter(ch);

    return 0;
}
```

**Output:**




**Question 4:** Write a program where input type of the shape output is the area of that shape.

**Objective:**

The objective of this program is to calculate and display the area of a shape (circle, square, or rectangle) based on user input.

**Algorithm:**

Step 1- start

Step 2- Input: Get the shape type (circle, square, or rectangle).

Step 3- If the shape is "circle":

Input radius and calculate area: .

Step 4- Else if the shape is "square":

Input side length and calculate area: .

Step 5- Else if the shape is "rectangle":

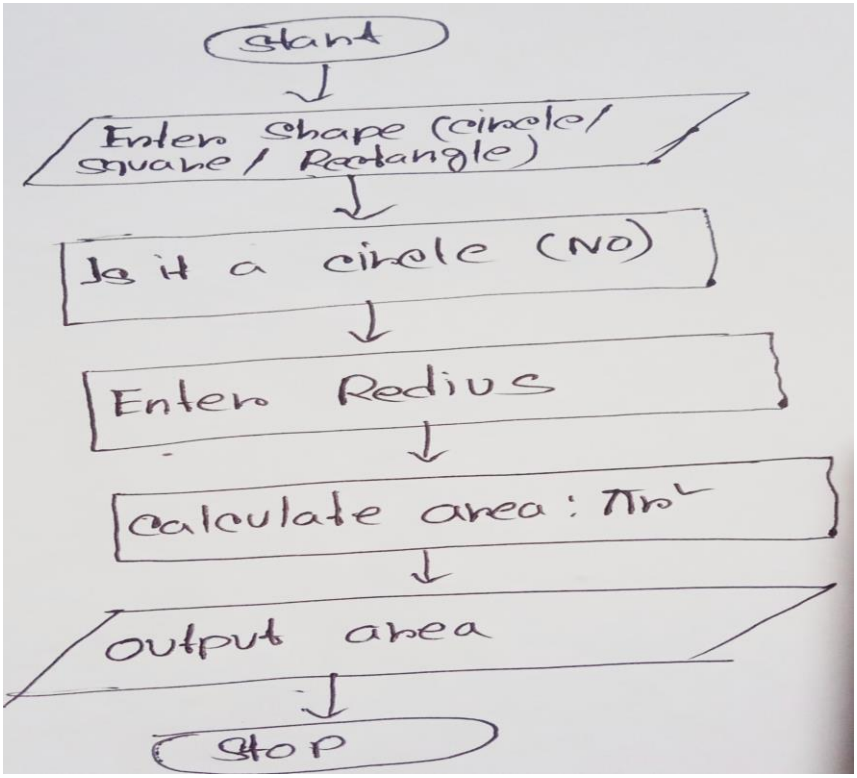
Input length and width and calculate area: .

Step 6- Else: Print "Invalid shape".

Step 7- Output: Display the area.

Step 8- End.

**Flowchart:**




**Code:**

in.c

```c
#include <stdio.h>
#include <math.h>

void circleArea(double radius) {
    double area = M_PI * radius * radius;
    printf("Area of the circle: %.2lf\n", area);
}

void rectangleArea(double length, double width) {
    double area = length * width;
    printf("Area of the rectangle: %.2lf\n", area);
}

void triangleArea(double base, double height) {
    double area = 0.5 * base * height;
    printf("Area of the triangle: %.2lf\n", area);
}

int main() {
    int choice;
    double a, b;

    printf("Select the shape to calculate the area:\n");
    printf("1. Circle\n2. Rectangle\n3. Triangle\n");
    printf("Enter your choice (1-3): ");
    scanf("%d", &choice);

    switch (choice) {
        case 1:
            printf("Enter the radius of the circle: ");
```

```c
int main() {
    int choice;
    double a, b;

    printf("Select the shape to calculate the area:\n");
    printf("1. Circle\n2. Rectangle\n3. Triangle\n");
    printf("Enter your choice (1-3): ");
    scanf("%d", &choice);

    switch (choice) {
        case 1:
            printf("Enter the radius of the circle: ");
            scanf("%lf", &a);
            circleArea(a);
            break;
        case 2:
            printf("Enter the length and width of the rectangle: ");
            scanf("%lf %lf", &a, &b);
            rectangleArea(a, b);
            break;
        case 3:
            printf("Enter the base and height of the triangle: ");
            scanf("%lf %lf", &a, &b);
            triangleArea(a, b);
            break;
        default:
            printf("Invalid choice!\n");
            break;
    }

    return 0;
}
```

**Output:**