2025.03.06

SWT11022: Practical for Fundamentals of Programming

Department of Information & Communication Technology
Faculty of Technology
South Eastern University of Sri Lanka

Time: - 09.30 am - 12.30 pm Lab Sheet 04

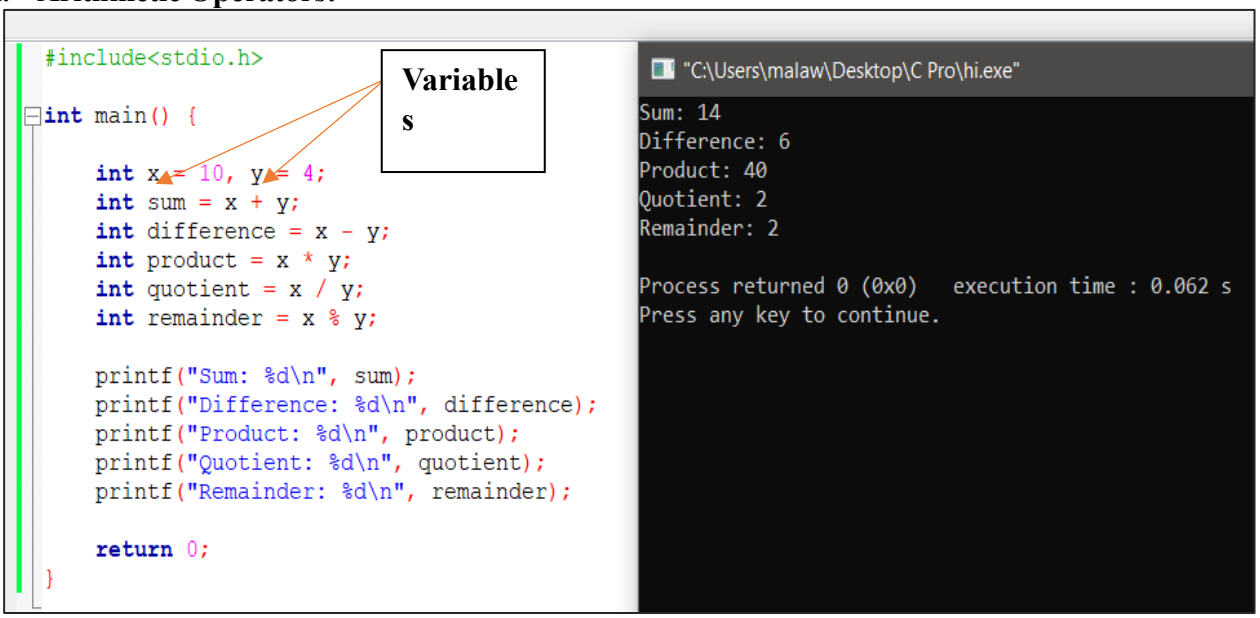
Title: Introduction to the Operators in C Programming

Objective:

- Understand and practice arithmetic and comparison operators.
- Understand and practice logical and assignment operators.
- Understand and practice the ternary operator and bitwise operators.

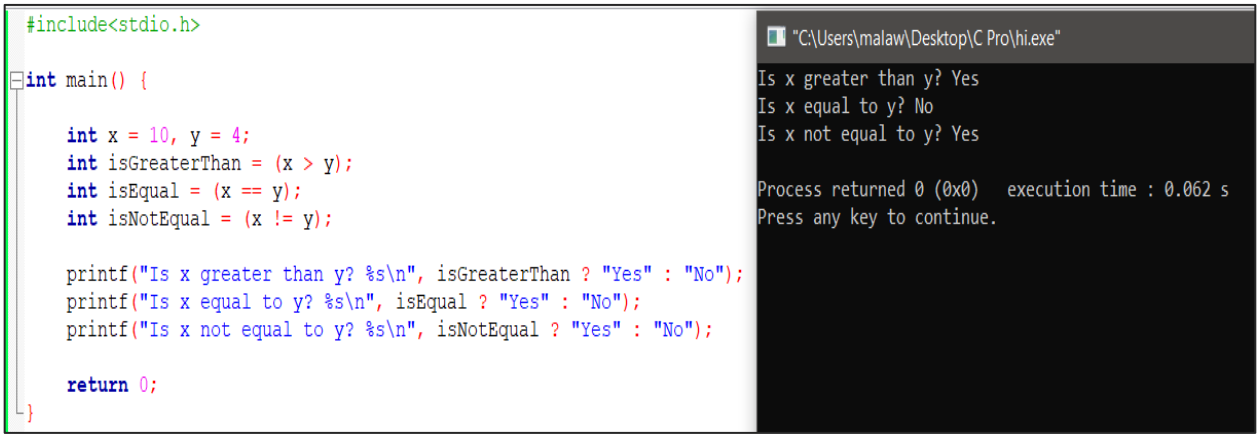
Practical 1: Arithmetic and Comparison Operators

1. Arithmetic Operators:




```c
#include<stdio.h>

int main() {

    int x = 10, y = 4;
    int sum = x + y;
    int difference = x - y;
    int product = x * y;
    int quotient = x / y;
    int remainder = x % y;

    printf("Sum: %d\n", sum);
    printf("Difference: %d\n", difference);
    printf("Product: %d\n", product);
    printf("Quotient: %d\n", quotient);
    printf("Remainder: %d\n", remainder);

    return 0;
}
```

2. Comparison Operators:




```c
#include<stdio.h>

int main() {

    int x = 10, y = 4;
    int isGreaterThan = (x > y);
    int isEqual = (x == y);
    int isNotEqual = (x != y);

    printf("Is x greater than y? %s\n", isGreaterThan ? "Yes" : "No");
    printf("Is x equal to y? %s\n", isEqual ? "Yes" : "No");
    printf("Is x not equal to y? %s\n", isNotEqual ? "Yes" : "No");

    return 0;
}
```

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Practical 2: Logical Operators and Assignment Operators

1. Logical Operators:

```c
#include<stdio.h>

int main() {

    int condition1 = 1; // true
    int condition2 = 0; // false
    int condition3 = 1; // true

    int result1 = condition1 && condition2;
    int result2 = condition1 || condition3;
    int result3 = !condition2;

    printf("Result 1: %s\n", result1 ? "true" : "false");
    printf("Result 2: %s\n", result2 ? "true" : "false");
    printf("Result 3: %s\n", result3 ? "true" : "false");

    return 0;
}
```

```
"C:\Users\malaw\Desktop\C Pro\hi.exe"
Result 1: false
Result 2: true
Result 3: true

Process returned 0 (0x0)
Press any key to continue.
```

2. Assignment Operators:

```c
#include<stdio.h>

int main() {

    int count = 5;
    count++;  // Increment
    int total = 10;
    total += 3;  // Add 3 to total

    printf("Updated Count: %d\n", count);
    printf("Updated Total: %d\n", total);
```

```
"C:\Users\malaw\Desktop\C Pro\hi.exe"
Result 1: false
Result 2: true
Result 3: true

Process returned 0 (0x0)
Press any key to continue.
```

Practical 3: Ternary Operator and Bitwise Operators

1. Ternary Operator:

```c
#include<stdio.h>

int main() {

    int value = 6;
    char result = (value % 2 == 0) ? 'E' : 'O';
    printf("Value is %c (E: Even, O: Odd)\n", result);


    return 0;
}
```

```
"C:\Users\malaw\Desktop\C Pro\hi.exe"
Value is E (E: Even, O: Odd)

Process returned 0 (0x0)   execution
Press any key to continue.
```

2. Bitwise Operators:

```c
#include<stdio.h>

int main() {

    int x = 12; // 1100
    int y = 6;  // 0110

    int andResult = x & y;
    int orResult = x | y;
    int xorResult = x ^ y;
    int notResult = ~x;
    int leftShift = x << 2;
    int rightShift = y >> 1;

    printf("AND Result: %d\n", andResult);
    printf("OR Result: %d\n", orResult);
    printf("XOR Result: %d\n", xorResult);
    printf("NOT Result: %d\n", notResult);
    printf("Left Shift Result: %d\n", leftShift);
    printf("Right Shift Result: %d\n", rightShift);

    return 0;
}
```

```
"C:\Users\malaw\Desktop\C Pro\hi.exe"
AND Result: 4
OR Result: 14
XOR Result: 10
NOT Result: -13
Left Shift Result: 48
Right Shift Result: 3

Process returned 0 (0x0)
Press any key to continue.
```

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Practical 4: Prefix and Postfix Increment / Decrement

1. Prefix and Postfix Increment:

```c
#include<stdio.h>

int main() {
    int x = 10, y = 20;

    printf("----PRE INCREMENT EXAMPLE----\n");
    printf("Value of x: %d\n", x);
    printf("Value of x: %d\n", ++x);
    printf("Value of x Incremented: %d\n", x);

    printf("\n----POST INCREMENT EXAMPLE----\n");
    printf("Value of y: %d\n", y);
    printf("Value of y: %d\n", y++);
    printf("Value of Incremented y: %d\n", y);

    return 0;
}
```

```
"C:\Users\malaw\Desktop\C Pro\hi.exe"
----PRE INCREMENT EXAMPLE----
Value of x: 10
Value of x: 11
Value of x Incremented: 11

----POST INCREMENT EXAMPLE----
Value of y: 20
Value of y: 20
Value of Incremented y: 21

Process returned 0 (0x0)   execution time : 0.078 s
Press any key to continue.
```

2. Prefix and Postfix Decrement:

```c
#include<stdio.h>

int main() {
    int x = 10, y = 20;

    printf("----PRE DECREMENT EXAMPLE----\n");
    printf("Value of x: %d\n", x);
    printf("Value of x: %d\n", --x);
    printf("Value of x Decremented: %d\n", x);

    printf("\n----POST DECREMENT EXAMPLE----\n");
    printf("Value of y: %d\n", y);
    printf("Value of y: %d\n", y--);
    printf("Value of Decremented y: %d\n", y);

    return 0;
}
```

```
"C:\Users\malaw\Desktop\C Pro\hi.exe"
----PRE DECREMENT EXAMPLE----
Value of x: 10
Value of x: 9
Value of x Decremented: 9

----POST DECREMENT EXAMPLE----
Value of y: 20
Value of y: 20
Value of Decremented y: 19

Process returned 0 (0x0)   execu
Press any key to continue.
```

3. Combined Pre and Post Increment:

```c
#include<stdio.h>

int main() {
    int x = 10, sum = 33;

    printf("Initial x: %d\n", x);
    ++x;
    printf("After Pre-Increment: %d\n", x);

    ++x;
    printf("After another Pre-Increment: %d\n", x);

    sum += x;
    printf("Sum: %d\n", sum);

    x++;
    x++;
    printf("Final x: %d\n", x);
    printf("Final sum: %d\n", sum);

    return 0;
}
```

```
"C:\Users\malaw\Desktop\C Pro\hi.exe"
Initial x: 10
After Pre-Increment: 11
After another Pre-Increment: 12
Sum: 45
Final x: 14
Final sum: 45

Process returned 0 (0x0)   execu
Press any key to continue.
```

Tasks

1. Write a C program to perform the following:
    a. Declare three integer variables `a`, `b`, and `c` with any values.
    b. Find the largest number among the three using **comparison operators**.
    c. Display the largest number using the **ternary operator**.
    d. Use **arithmetic operators** to calculate the average of three numbers and print the result.
2. Write a C program to perform the following:

    a. Declare three Boolean variables: `isRainy`, `isHoliday`, and `isWeekend`.
    b. Assign any Boolean values to the variables.
    c. Use **logical operators** to check if the student can go on a trip:
    a. Condition:
    The trip will happen only if it's **not rainy** and either a **holiday** or a **weekend**.
    d. Display the result using `printf`.
    e. Use **assignment operators** to add 5 marks to the student's current marks and display the updated marks.

3. Write a C program to perform the following:
    a. Declare two integer variables `x` and `y` with any values.
    b. Perform **bitwise AND**, **OR**, and **XOR** operations.
    c. Display the results in binary form.
    d. Demonstrate both **prefix** and **postfix** increment and decrement operators on `x` and `y`.
    e. Print the results before and after each operation.

Report Submission Guidelines

- Submit the Report by 10/03/2025.
- Late submissions will not be accepted.
- Report Structure
    - Practical No
    - Date of Submission
    - Title
    - Objective of the practical.
    - Exercise
    - Challenges
    - Conclusion
    - References