Structured Programming Language Sessional

CSE 1104

Sessional - 02

Introduction to Expressions in C

Department of Computer Science and Engineering

Pabna University of Science and Technology

1 Expressions

An expression is a formula in which operands are linked to each other by the use of operators to compute a value. An operand can be a function reference, a variable, an array element or a constant.

There are four types of expressions exist in C:

- Arithmetic expressions
- Relational expressions
- Logical expressions
- Conditional expressions

1.1 Example 1: Working of post-increment and pre-increment operator

Increment operators are used to increase the value by one while decrement works opposite increment. Decrement operator decrease the value by one.

Pre-increment (++i) - Before assigning the value to the variable, the value is incremented by one.

Post-increment (i++) - After assigning the value to the variable, the value is incremented.

The following is the syntax of pre and post increment.

$++variable\_name; //Pre-increment$

$variable\_name++; //Post-increment$

Code:

```
#include <stdio.h>

int main()
{
  int i;

  i = 4;

  printf( "%d\n", i );
  printf( "%d\n", i++ );   //post increment
  printf( "%d\n\n", i );

  i = 4;
  printf( "%d\n", i );
  printf( "%d\n", ++i );   //preincrement
  printf( "%d\n", i );

  return 0;
}
```

Output:

```
4
4
5

4
5
5
```

1.2 Example 2: Write C Program to solve simple Arithmetic Operators

Algorithm 1 Steps in pseudo code:

1: Step1: Start
2: step2: assign value in variable a, assign value in variable b and declare variable c
3: step3: Calculate c (c = a + b)
4: step4: Display result of addition, value of c on the monitor with the message "a+b = "
5: step5: Calculate c (c = a - b)
6: step6: Display result of subtraction, value of c on the monitor with the message "a-b = "
7: step7: Calculate c (c = a * b)
8: step8: Display result of multiplication, value of c on the monitor with the message "a*b = "
9: step9: Calculate c (c = a / b)
10: step10: Display result of division, value of c on the monitor with the message "a/b = "
11: step11: Calculate c (c = a % b)
12: step12: Display result of modulo-division , value of c on the monitor with the message "Remainder when a divided by b = "
13: step13: end

Code:

```c
#include <stdio.h>
int main()
{
    int a = 9,b = 4, c;

    c = a+b;
    printf("a+b = %d \n",c);
    c = a-b;
    printf("a-b = %d \n",c);
    c = a*b;
    printf("a*b = %d \n",c);
    c = a/b;
    printf("a/b = %d \n",c);
    c = a%b;
    printf("Remainder when a divided by b = %d \n",c);

    return 0;
}
```

Output:

```
a+b = 13
a-b = 5
a*b = 36
a/b = 2
Remainder when a divided by b=1
```

1.3 Example 3: Write C Program to find the Volume of a Cylinder(take input from user).

Algorithm 2 Steps in pseudo code:

1: Step1: Start
2: step2: declare float variable vol, r and h
3: step3: Display a message on the monitor "enter radius: "
4: step4: read r
5: step5: Display a message on the monitor "enter height: "
6: step6: read h
7: step7: Calculate vol (vol =(22*r*r*h)/7)
8: step8: Display result of Volume of a Cylinder, value of vol on the monitor with the message "VOC: "
9: step9: end

Code:

```c
#include<stdio.h>
int main()
{

    float vol,r,h;
    printf("enter radius: ");
    scanf("%f",&r);
    printf("enter height: ");
    scanf("%f",&h);

    vol=(22*r*r*h)/7;
    printf("VOC: %f\n",vol);
    return 0;
}
```

Output:

```
enter radius: 7
enter height: 7
VOC: 1078.000000
```

2 Discussion & Conclusion

Based on the focused objective(s) to understand about different types of expressions in C program, the additional lab exercise made me more confident towards the fulfilment of the objectives(s).

3 Lab Task (Please implement yourself and show the output to the instructor)

1. Write a C program to enter two numbers and perform all arithmetic operations.
2. Write a C Program to Calculate Area and Circumference of Circle.
3. Write a C program to enter length in centimeter and convert it into meter and kilometer.
4. Write a C Program to Calculate Area of a Rectangle, take height and width as user input.

4 Lab Exercise (Submit as a report)

1. Write a C Program to Calculate Area of a Square, take length of one side as user input.
2. Write a C program to enter temperature in °Celsius and convert it into °Fahrenheit.
3. Write a C program to enter temperature in Fahrenheit(°F) and convert it into Celsius(°C).
4. Write a C program to enter marks of five subjects and calculate total and average marks.

5 Policy

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