BCA 115: LAB I (C Programming)

Assignment 1

Assignment No 1:- Study of Data types, simple operators (expressions)

You should read following topics before starting this exercise
1. Different basic data types in C and rules of declaring variables in C
2. Different operators and operator symbols in C
3. How to construct expressions in C, operator precedence
4. Problem solving steps- writing algorithms and flowcharts

Data type Table

Data	Data Format	C Data Type	C Variable declaration	Input Statement	Output statement
quantity month credit-card number	Numeric	int Short int long int	int quantity; short month; long ccno;	scanf("%d",&quantity); scanf("%d",&month); scanf("%ld",&ccno);	printf("The quantity is %d", quantity); printf("The credit card number is %ld, ccno);
price ☐	real	float double	float price; const double pi=3.141593;	scanf ("%f",& price);	printf("The price is %5.2f",price);
grade	character		char grade;	scanf("%c",&grade)	printf("The grade is %c",grade);

1. Expression Examples

Expression	C expression
Increment by a 3	a = a + 3
Decrement b by 1	b=b-1 or b--
2 a² + 5 b/2	2*a*a + 5*b/2
7/13(x-5)	(float)7/13*(x-5)
5% of 56	(float)5/100*56
n is between 12 to 70	n>=12 && n<=70
☐r²h	Pi*r*r*h
n is not divisible by 7	n % 7 != 0
n is even	n%2== 0
ch is an alphabet	ch>='A' && ch<='Z' || ch>='a' && ch<='z'

Note: The operators in the above expressions will be executed according to precedence and associativity rules of operators.

2. Sample program- to calculate and print simple interest after accepting principal sum, number of years and rate of interest.

3. Program development steps

Step 1 : Writing the Algorithm	Step 2 : Draw the flowchart	Step 3 : Writing Program

1. Start
2. Accept principal sum, rate of interest and number of years
3. Compute Simple interest
4. Output Simple Interest
5. Stop
	start
	↓
	Read principal sum, rate and no of years
	↓
	Compute Simple interest
	↓
	Print Simple Interest
	↓
	stop
		/* Program to calculate simple interest */
		#include <stdio.h>
		main( )
		{ /* variable declarations */
		float amount, rateOfInterest, simpleInterest; int noOfYears;
		/* prompting and accepting input */
		printf("Give the Principal Sum");
		scanf("%f",&amount);
		printf("Give the Rate of Interest");
		scanf("%f",&rateOfInterest);
		printf("Give the Number of years");
		scanf("%d",&noOfYears);
		
		/* Compute the simple Interest*/
		simpleInterest=amount*noOfYears*rateOfInterest / 100;
		
		/* Print the result*/
		printf("The simple Interest on amount %7.2f for %d years at the rate %4.2f is %6.2f", amount, noOfYears, rateOfInterest, simpleInterest);
		}

Set A . Apply all the three program development steps for the following examples.

1. Accept dimensions of a cylinder and print the surface area and volume (Hint: surface area $= 2\pi r^2 + 2\pi rh$, volume $= \pi r^2 h$)

2. Accept temperatures in Fahrenheit(F) and print it in Celsius(C) and Kelvin(K) (Hint: $C = 5/9(F - 32)$, $K = C + 273.15$)

3. Accept initial velocity (u), acceleration (a) and time (t). Print the final velocity (v) and the distance (s) travelled. (Hint: $v = u + at$, $s = u + at^2$)

4. Accept two numbers and print arithmetic and harmonic mean of the two numbers (Hint: $AM = (a+b)/2$, $HM = (a*b)/(a+b)$)

5. Accept 2 integers and display their squares on one line, cube on another and square root on third line.

6. Accept a character from the keyboard and display its previous and next character in order. Ex. If the character entered 'd', display "The previous character is c", "The next character is e".

7. Accept a character and display its ASCII value. Also display the ASCII value of space, tab, and enter.
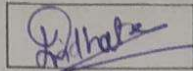
Signature of Instructor [signature] Date 9 /8 /19

Set B. Apply all the three program development steps for the following examples.

1. Accept the x and y coordinates of two points and compute the distance between the two points.

2. Accept two integers from the user and interchange them. Display the interchanged numbers.

3. Accept 4 integers a, b, c, d. Add numbers a and b. Subtract d from c and then divide the sum of a and b by the result subtraction. Display the exact answer.

4. Accept 2 integers and display its integer division, remainder and exact division.
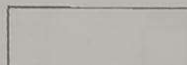
Signature of Instructor [Kulhata]   Date [9 / 8 / 19]

Set C. Write a program to solve the following problems

1. Consider a room having one door and two windows both of the same size. Accept dimensions of the room, door and window .Print the area to be painted (interior walls) and area to be white washed (roof).

2. The basic salary of an employee is decided at the time of employment, which may be different for different employees. Apart from basic, employee gets 10% of basic as house rent, 30% of basic as dearness allowance. A professional tax of 5% of basic is deducted from salary. Accept the employee id and basic salary for an employee and output the take home salary of the employee.

Signature of Instructor [ ]   Date [/ /]