**Presidency University**

**School of Engineering**

**Department of Computer Science and Engineering**

**CSE2006: Data structures Laboratory**

LABSHEET 1 PROGRAMS AND SOLUTIONS

# OPERATORS & CONDITIONAL STATEMENTS

Objectives:

To understand the concept of operators and conditional statements

Apply conditional statements in the real world problems.

**Topics Include:**

**Conditional statements and logical operators.**

## // Program 1: C Program to implement Simple-if statement

#include<stdio.h> int main()

{

int a, b;

printf(" Enter the Value of a and b\n"); scanf("%d%d",&a,&b);

if(a==b)

{

printf(“Inside the if statement\n”); printf("a=%d \t b=%d are equal\n",a,b);

}

printf(“After the if statement control says am here\n”);

}

## //Problem 2

A simple arithmetic calculator performs operations like addition, subtraction, multiplication, division and modulus. An application has to be developed depending on the symbol of arithmetic operator the result should be evaluated like operator.

## Requirements

1. Capture the operator and two operands (a and b)
2. Check the operator with respect to the arithmetic operator symbol
3. Evaluate the expression
4. Display the result

#include<stdio.h> int main()

{

char op; int a,b,res;

printf(“enter the values of a and b\n”); scanf(“%d%d”,&a,&b);

printf(“enter the operator\n”); scanf(“ %c”,&op);

if(op== ‘+’)

{

res=a+b;

printf(“addition of %d and %d is %d\n”,a,b,res);

}

if(op== ‘-’)

{

res=a-b;

printf(“Difference of %d and %d is %d\n”,a,b,res);

}

if(op== ‘\*’)

{

res=a\*b;

printf(“product of %d and %d is %d\n”,a,b,res);

}

if(op== ‘/’)

{

res=a/b;

printf(“Quotient of %d and %d is %d\n”,a,b,res);

}

if(op== ‘%’)

{

res=a%b;

printf(“Remainder of %d and %d is %d\n”,a,b,res);

}

printf(“Program Completed Calculation ends here\n”);

}

## // Problem 3

General Elections were announced by the election commission. Kishan is a young person who is very much enthusiastic to cast his vote. He would like to know whether he is eligible to vote depending on his year of birth.

Following are requirements to solve the problem

* 1. Capture the year of birth and current year
  2. Calculate the age using current year and year of birth.
  3. Check whether Kishan is eligible to vote or not. (if age is greater than or equal to 18 then he is eligible to vote)

#include<stdio.h> void main()

{

int age, yob, cy;

printf("\n Enter the year of birth and current year: "); scanf("%d%d", &yob, &cy);

age = cy - yob ; if ( age >= 18 )

{

printf("Age is %d hence Eligible to vote", age);

}

else

{

printf("Age is %d hence not Eligible to vote", age);

}

}

/\* Output:

Test case 1:

Enter the year of birth and current year: 2000 2020 Age is 20 hence Eligible to vote

Test case 2:

Enter the year of birth and current year: 2010 2020 Age is 10 hence Not eligible to vote

\*/

## // Problem 4

Students of 1st year will have choice of going to Physics Cycle or Chemistry Cycle of the academic curriculum. Teacher ask the student to enter the choice. If the choice is p student is assigned Physics Cycle otherwise Chemistry Cycle. Software need to be developed with following requirement:

1: Read the choice from the student 2: Check the choice

3: Display appropriate message (Physics Cycle or Chemistry Cycle)

#include<stdio.h> void main()

{

char ch;

printf("\n Enter your choice, for Physics Cycle press p: "); scanf(" %c",&ch);

if(ch=='p')

{

printf("\n Physics Cycle");

}

else

{

printf("\n Chemistry Cycle");

}

}

/\* Output:

Test case 1:

Enter your choice, for Physics Cycle press p: p Physics Cycle

Test case 2:

Enter your choice, for Physics Cycle press p: f Chemistry Cycle

\*/

## // Problem 5

Modify the problem 2 using else if ladder

A simple arithmetic calculator performs operations like addition, subtraction, multiplication, division and modulus. An application has to be developed depending on the symbol of arithmetic operator the result should be evaluated like operator.

## Requirements

1. Capture the operator and two operands (a and b)
2. Check the operator with respect to the arithmetic operator symbol
3. Evaluate the expression
4. Display the result

#include<stdio.h> int main()

{

char op; int a,b,res;

printf("Enter the values of a and b\n"); scanf("%d%d",&a,&b);

printf("Enter the operator\n"); scanf(" %c",&op);

if(op== '+')

{

res=a+b;

printf("addition of %d and %d is %d\n",a,b,res);

}

else if(op== '-')

{

res=a-b;

printf("Difference of %d and %d is %d\n",a,b,res);

}

else if(op== '\*')

{

res=a\*b;

printf("product of %d and %d is %d\n",a,b,res);

}

else if(op== '/')

{

res=a/b;

printf("Quotient of %d and %d is %d\n",a,b,res);

}

else if(op== '%')

{

}

else

res=a%b;

printf("Remainder of %d and %d is %d\n",a,b,res);

printf("Invalid Input\n");

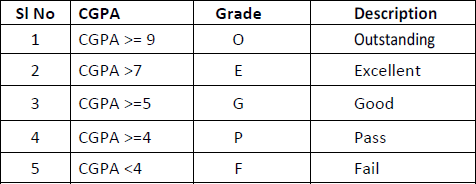
printf("Program Completed Calculation ends here\n");

}

|  |  |
| --- | --- |
| /\* Output:  Test case 1:  Enter the values of a and b 2 6  Enter the operator  +  addition of 2 and 6 is 8  Program Completed Calculation ends here Test case 2:  Enter the values of a and b 3  1  Enter the operator  -  Difference of 3 and 1 is 2  Program Completed Calculation ends here Test case 3:  Enter the values of a and b 4 8  Enter the operator  \*  product of 4 and 8 is 32  Program Completed Calculation ends here | Test case 4:  Enter the values of a and b 8 5  Enter the operator  /  Quotient of 8 and 5 is 1  Program Completed Calculation ends here Test case 5:  Enter the values of a and b 8 5  Enter the operator  %  Remainder of 8 and 5 is 3  Program Completed Calculation ends here  Test case 6:  Enter the values of a and b 4 6  Enter the operator #  Invalid Input  Program Completed Calculation ends here \*/ |

## // Problem 6

Shashi is a Final year student. As part of his assessments he has appeared for all the assessments and has obtained a certain CGPA. He would like to know his final grade based on the CGPA that he obtained Following are requirements to solve the problem

1. There are 5 grades allotted to the students based on the CGPA by the university
2. The CGPA of Shashi has to be captured to determine the Grade.
3. Final grade should be displayed.

#include<stdio.h> void main()

{

float cgpa;

printf("\n Enter the CGPA:"); scanf("%f",&cgpa);

if(cgpa >= 9)

printf("Grade is O, Outstanding"); else if(cgpa > 7)

printf("Grade is E, Excellent");

else if(cgpa >= 5)

printf("Grade is G, Good"); else if(cgpa >= 4)

printf("Grade is P, Pass");

else

printf(“Grade is F

printf("Grade is F, Fail");

}

## //Problem 7

Modify the Problem 6 and code using switch

A simple arithmetic calculator performs operations like addition, subtraction, multiplication, division and modulus. An application has to be developed depending on the symbol of arithmetic operator the result should be evaluated like operator.

## Requirements

1. Capture the operator and two operands (a and b)
2. Check the operator with respect to the arithmetic operator symbol
3. Evaluate the expression
4. Display the result

#include<stdio.h> int main()

{

char op; int a,b,res;

printf("Enter the values of a and b\n"); scanf("%d%d",&a,&b);

printf("Enter the operator\n"); scanf(" %c",&op);

switch (op)

{

case '+': res=a+b;

printf("addition of %d and %d is %d\n",a,b,res); break;

case '-': res=a-b;

printf("Difference of %d and %d is %d\n",a,b,res); break;

case '\*': res=a\*b;

printf("product of %d and %d is %d\n",a,b,res); break;

case '/': res=a/b;

printf("Quotient of %d and %d is %d\n",a,b,res); break;

case '%': res=a%b;

printf("Remainder of %d and %d is %d\n",a,b,res); break;

default: printf("Invalid Input\n");

}

printf("Program Completed Calculation ends here\n");

}

|  |  |
| --- | --- |
| /\* Output:  Test case 1:  Enter the values of a and b 2 6 Enter the operator  +  addition of 2 and 6 is 8  Program Completed Calculation ends here  Test case 2:  Enter the values of a and b 3 1  Enter the operator  -  Difference of 3 and 1 is 2  Program Completed Calculation ends here  Test case 3:  Enter the values of a and b 4 8 Enter the operator  \*  product of 4 and 8 is 32  Program Completed Calculation ends here | Test case 4:  Enter the values of a and b 8 5 Enter the operator  /  Quotient of 8 and 5 is 1  Program Completed Calculation ends here  Test case 5:  Enter the values of a and b 8 5 Enter the operator  %  Remainder of 8 and 5 is 3  Program Completed Calculation ends here  Test case 6:  Enter the values of a and b 4 6 Enter the operator #  Invalid Input  Program Completed Calculation ends here  \*/ |

## Program 8

## Program to be written using logical operator to be written in record

#include<stdio.h> void main()

{

int rank, percentage; printf("Enter the rank: "); scanf("%d",&rank); printf("Enter the percentage: "); scanf("%d",&percentage);

if ( rank < 15000 || percentage >= 75 )

{

printf("Eligible to Contest for CR");

}

else

{

printf("Not Eligible to Contest for CR");

}

}

/\*Output:

Test Case 1:

Enter the rank: 2000 Enter the percentage: 80 Eligible to Contest for CR Test Case 2:

Enter the rank: 18000 Enter the percentage: 65

Not Eligible to Contest for CR Test Case 3:

Enter the rank: 500 Enter the percentage: 74

Eligible to Contest for CR Test Case 4:

Enter the rank: 20000 Enter the percentage: 75 Eligible to Contest for CR

\*/

**Program 9**

## Program to be written first without logical operator

#include<stdio.h> void main()

{

int rank, percentage; printf("Enter the rank: "); scanf("%d",&rank); printf("Enter the percentage: "); scanf("%d",&percentage);

if ( rank < 15000 )

{

if ( percentage >= 75 )

{

printf("Eligible to Contest for CR");

}

else

{

printf("Not Eligible to Contest because of percentage");

}

}

else

{

printf("Not Eligible to Contest because of rank");

}

}

/\* **Output:**

gedit crnestedifand.c gcc crnestedifand.c

./a.out

Test Case 1:

Enter the rank: 100 Enter the percentage: 90

Eligible to Contest for CR

Test Case 2:

Enter the rank: 25000 Enter the percentage: 60

Not Eligible to Contest because of rank Test Case 3:

Enter the rank: 14500 Enter the percentage: 72

Not Eligible to Contest because of percentage Test Case 4:

Enter the rank: 16000 Enter the percentage: 76

Not Eligible to Contest because of rank

\*/

**Exercise Questions:**

1. **Write a program to calculate Simple Interest**
2. **Write a program to solve various patterns.**
3. **Write a program to swap two numbers using arithmetic operators.**

A=10;

B=20; after swap a=20 and b=10 temp=a; temp=10 a=b; a=20 b=temp; //b=10

A=20;

B=10; a=a-b a=10

B=b+a b=20