

DECISION MAKING

IF-ELSE
IF- ELSE IF
SWITCH

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DECISIONS! DECISIONS!

We use relational and logical operators for decision making.

Works on 1 and 0

1 means True

0 means False

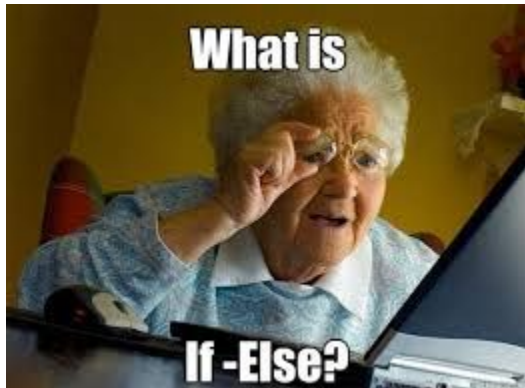
```
if ( bugs ) {  
    iHateProgramming();  
} else {  
    iLoveProgramming();  
}
```

RELATIONAL OPERATORS

Operator	Meaning of Operator	Example
<code>==</code>	Equal to	<code>5 == 3</code> is evaluated to 0
<code>></code>	Greater than	<code>5 > 3</code> is evaluated to 1
<code><</code>	Less than	<code>5 < 3</code> is evaluated to 0
<code>!=</code>	Not equal to	<code>5 != 3</code> is evaluated to 1
<code>>=</code>	Greater than or equal to	<code>5 >= 3</code> is evaluated to 1
<code><=</code>	Less than or equal to	<code>5 <= 3</code> is evaluated to 0

LOGICAL OPERATORS

Operator	Meaning	Example
&&	Logical AND. True only if all operands are true	If c = 5 and d = 2 then, expression <code>((c==5) && (d>5))</code> equals to 0.
	Logical OR. True only if either one operand is true	If c = 5 and d = 2 then, expression <code>((c==5) (d>5))</code> equals to 1.
!	Logical NOT. True only if the operand is 0	If c = 5 then, expression <code>!(c==5)</code> equals to 0.



```
if (x < y)
{
    printf("x is less than y\n");
}
```

```
if ( this condition is true )  
    execute this statement ;
```

```
if ( expression )  
    statement ;
```

```
if ( 3 + 2 % 5 )  
    printf ( "This works" ) ;
```

```
if ( a = 10 )  
    printf ( "Even this works" ) ;
```

```
if ( -5 )  
    printf ( "Surprisingly even this works" ) ;
```

WHAT WOULD BE THE OUTPUT?

```
#include<stdio.h>

int main( )
{
int a = 300, b, c ;
if ( a >= 400 )
{
    b = 300 ;
    c = 200 ;
    printf ( "\n%d %d", b, c ) ;
}
}
```



WHAT WOULD BE THE OUTPUT?

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

```
int main( )  
{  
  int a = 500, b, c ;  
  if ( a >= 400 )  
  {  
    b = 300 ;  
    c = 200 ;  
    printf ( "\n%d %d", b, c ) ;  
  }  
}
```



WHAT WOULD BE THE OUTPUT?

```
#include<stdio.h>

int main( )
{
int a = 300, b, c, d=300 ;
if ( a >= 400 || d<500 )
{
    b = 300 ;
    c = 200 ;
    printf ( "\n%d %d", b, c ) ;
}
}
```



WHAT WOULD BE THE OUTPUT?

```
#include<stdio.h>

int main( )
{
int a = 300, b, c, d=300 ;
if ( a >= 400 && d<500 )
{
    b = 300 ;
    c = 200 ;
    printf ( "\n%d %d", b, c ) ;
}
}
```





```
if (x < y)
{
    printf("x is less than y\n");
}
else
{
    printf("x is not less than y\n");
}
```

WHAT WOULD BE THE OUTPUT?

```
#include<stdio.h>

int main( )
{
    int x = 3, y = 5 ;

    if ( x == 3 )
        { printf ( "\n%d", x ) ; }
    else
        { printf ( "\n%d", y ) ; }
}
```



PRACTICE EXERCISE

Write a program to check whether a triangle is valid or not, when the three angles of the triangle are entered through the keyboard. A triangle is valid if the sum of all the three angles is equal to 180 degrees.

HOME ASSIGNMENT

1. Any integer is input through the keyboard. Write a program to find out whether it is an odd number or even number.
2. Any year is input through the keyboard. Write a program to determine whether the year is a leap year or not.
(Hint: Use the % (modulus) operator)
3. A five-digit number is entered through the keyboard. Write a program to obtain the reversed number and to determine whether the original and reversed numbers are equal or not.

LIFE IS AN ALL
"IF-ELSE"
STATEMENTS

"SUMAIYAH ZAHID"

YOU CAN PICK ONE ICE-CREAM ONLY

Vanilla vs chocolate ?



YOU CAN PICK ONE ICE-CREAM ONLY



IF ELSE VS IF ELSE IF

Only 1 block is run in If Else or either in If Else If.

```
#include <stdio.h>
int main()
{
    Char day='W';

    if (day=='M' || day == 'T' || day == 'S')
    {
        printf("Programming Class will be there.");
    }
    else
    {
        printf("NO class is scheduled! Hurray!");
    }

    return 0;
}
```

```
#include <stdio.h>
int main()
{
    char day='W';
    if (day=='M' || day == 'T' || day == 'S')
    {
        printf("Programming Class will be there.");
    }
    else if (day=='W' || day == 'F' || day == 't') // small t for Thursday
    {
        printf("No class is scheduled! Hurray!");
    }
    else
    {
        printf("Yay! It's Sunday");
    }
    return 0;}
```

PRACTICE PROBLEM

Write a program which asks a user about his marks and calculates a student's letter grade on the following condition.

90–100 = *A*

80–89 = *B*

70–79 = *C*

60–69 = *D*

below 60 = *F*

```
#include <stdio.h>
int main()
{
    int score;
    printf("Enter Your score: ");
    scanf("%d",&score);
    if (score<=100 && score >=90 )
    {    printf("Your grade is A! Congratulations!");    }
    else if (score<=89 && score >=80 )
    {    printf("Your grade is B! Very Good!");    }
    else if (score<=79 && score >=70 )
    {    printf("Your grade is C! Keep Working Hard!");    }
    else if (score<=69 && score >=60 )
    {    printf("Your grade is D! You need to improve!");    }
    else
    {    printf("You need to work al ot");    }
    return 0;}
}
```

HOME ASSIGNMENT

1. A library charges a fine for every book returned late. For first 5 days the fine is 50 paise, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a program to accept the number of days the member is late to return the book and display the fine or the appropriate message.
2. Write a program to find the greatest of the three numbers entered through the keyboard.

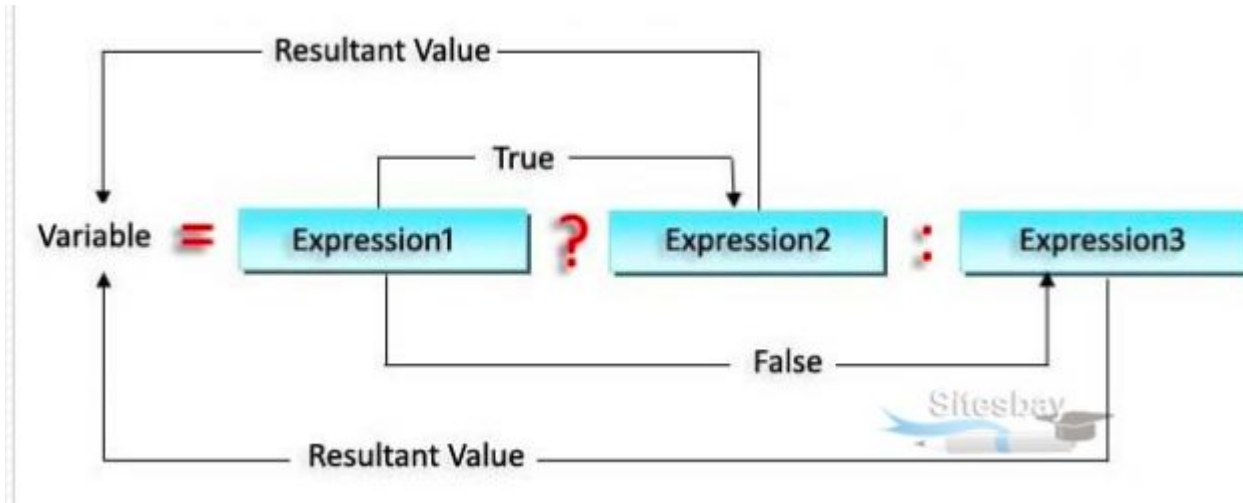
HOME ASSIGNMENT

3. Write a program that reads the temperature in centigrade and display a suitable message according to the temperature state below:

- Temp < 0 then Freezing weather
- Temp 0-10 then Very Cold weather
- Temp 10-20 then Cold weather
- Temp 20-30 then Normal in Temp
- Temp 30-40 then It's Hot
- Temp ≥ 40 then It's Very Hot

TERNARY OPERATOR

```
result = binaryCondition ? valueReturnedIfTrue : valueReturnedIfFalse;
```



TERNARY OPERATOR

```
#include <stdio.h>

int main()
{
    int m = 5, n = 4;

    (m > n) ? printf("m is greater than n that is %d > %d",
                    m, n)
            : printf("n is greater than m that is %d > %d",
                    n, m);

    return 0;
}
```

TERNARY OPERATOR

```
int a = 10, b = 20, c;  
  
if (a < b) {  
    c = a;  
}  
else {  
    c = b;  
}  
  
printf("%d", c);
```

```
int a = 10, b = 20, c;  
  
c = (a < b) ? a : b;  
  
printf("%d", c);
```

TERNARY OPERATOR

```
#include <stdio.h>
int main() {
    int num, a=10;
    printf("Enter a number: ");
    scanf("%d", &num);
    num%2==0 ?
    printf("%d is a even num.\n", num), a=14, printf("\n%d",a) :
    printf("%d is odd num.\n", num);
}
```

SWITCH CASE

Similar like if-else if.

In each case the value of item must be a constant, variables are not allowed.

```
switch (expression)
{
    case constant1:
        // statements
        break;

    case constant2:
        // statements
        break;

    .
    .
    .
    default:
        // default statements
}
```

```
//program to create a simple calculator
#include <stdio.h>
int main()
{
    char operator;
    int n1, n2;
    printf("Enter an operator (+, -, *, /): ");
    scanf("%c", &operator);
    printf("Enter two operands: ");
    scanf("%d %d",&n1, &n2);
    switch(operator)
    {
        case '+':
            printf("%d + %d = %d",n1, n2, n1+n2);
            break;

        case '-':
            printf("%d - %d = %d",n1, n2, n1-n2);
            break;
```

```
case '*':  
    printf("%d * %d = %d",n1, n2, n1*n2);  
    break;
```

```
case '/':  
    printf("%d / %d = %d",n1, n2, n1/n2);  
    break;
```

```
// operator doesn't match any case constant +, -, *, /  
default:  
    printf("Error! operator is not correct");
```

```
}
```

```
return 0;
```

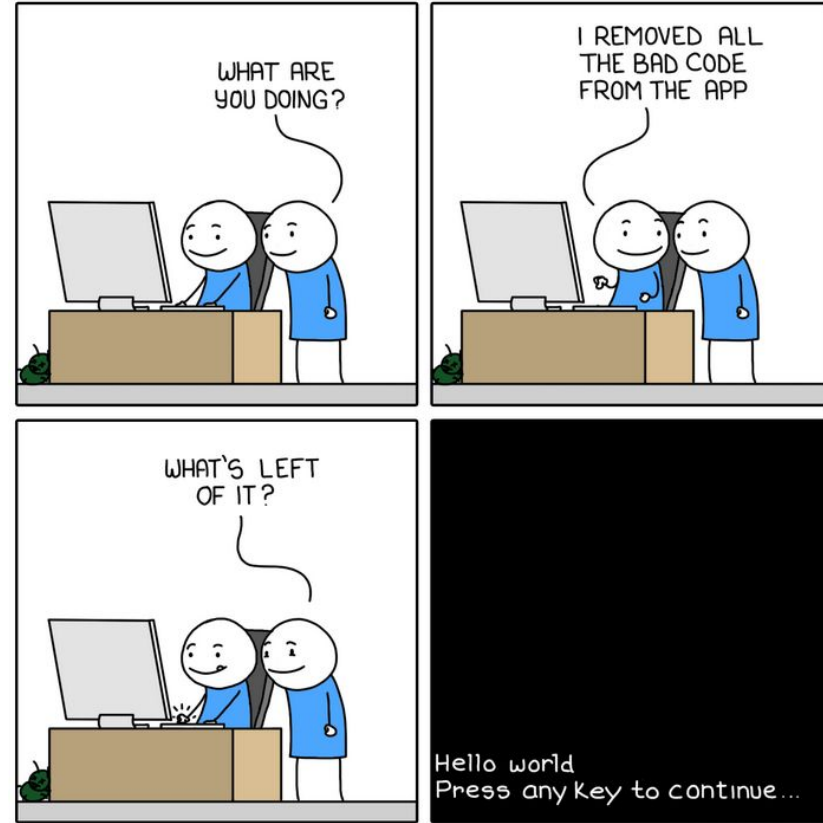
```
}
```

PRACTISE EXERCISE

You are searching for a department in a university and you're asked to select a school from a choice of three schools namely

1. School of Computer Science
2. School of Business
3. School of Engineering

Read an integer value for the selection of department. Implement this using switch case.



SWITCH CASE

You can put the cases in any order you please.

If there are multiple statements to be executed in each case there is no need to enclose them within a pair of braces (unlike if, and else).

The break is needed if you want to terminate the switch after execution of one choice. Otherwise the next case would get evaluated.

We can also have null statements by just including a : or let the switch statement fall through by omitting any statements.

```
#include <stdio.h>
int main()
{   char letter;
    int vowels=0, consonants=0;
    printf("Enter a letter");
    scanf("%c", &letter);
    switch(letter)
    {
        case 'A':
        case 'E':
        case 'I':
        case 'O':
        case 'U': vowels++;
                  break;
        default:  consonants++;
    }
    return 0;
}
```

VALID AND INVALID



Not allowed:

case `i <= 20:`

case `2.5:`

case `a+b:`

Legal expressions:

`switch (i + j * k)`

`switch (23 + 45 % 4 * k)`

`switch (a < 4 && b > 7)`

```
#include <stdio.h>
int main()
{   int i=0, j=2, k=1;
    switch(i+j*k)
    {
        case 0:  printf("Answer is zero");
                  break;
        case 1:  printf("Answer is one");
                  break;
        case 2:  printf("Answer is two");
                  break;
        default: printf("No Answer");
    }
    return 0;
}
```

```
#include <stdio.h>
int main()
{   int i=0, j=2, k=1;
    switch(i<j || i<k)
    {
        case 0:  printf("Answer is zero");
                  break;
        case 1:  printf("Answer is one");
                  break;
        default: printf("No Answer");
    }
    return 0;
}
```

```
#include <stdio.h>
int main()
{   int i=2021;
    switch(i%4)
    {
        case 0: printf("It's a leap year");
                 break;
        case 1: printf("It's not a leap year");
                 break;
        case 2: printf("It's not a leap year");
                 break;
        case 3: printf("It's not a leap year");
                 break;
    }
    return 0;
}
```

HOME ASSIGNMENT



1. Read an integer value. Assume it is the number of a month of the year, print out the name of that month using switch case.
2. Write a C program which reads an input integer 1-7 and prints day of week name using switch case.

HOME ASSIGNMENT

3. Write a program which reads two integer values. If the first is less than the second, print the message up. If the second is less than the first, print the message down. If the numbers are equal, print the message equal. If there is an error reading the data, print a message containing the word Error. [use switch case only]

4. Must read

<https://www.geeksforgeeks.org/interesting-facts-about-switch-statement-in-c/>