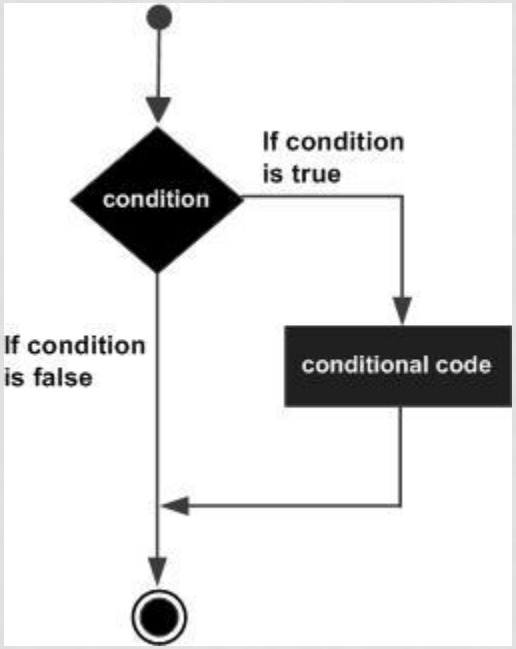
IMPERATIVE PROGRAMMING

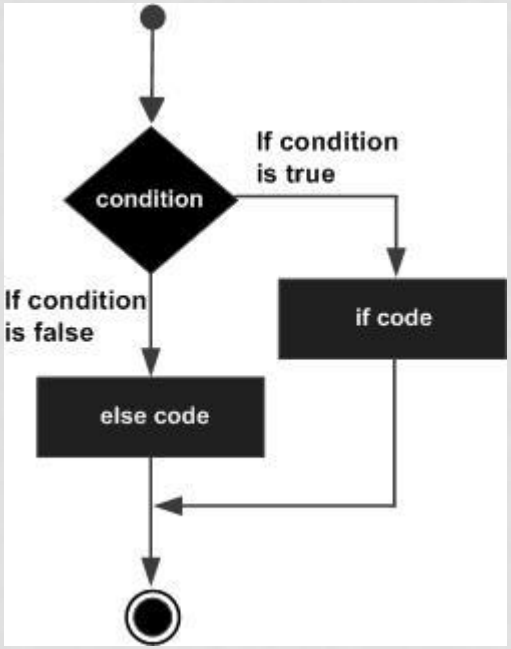
UNIT 2

Compiled by Ms. Prajakta Joshi

IF CONDITIONAL STATEMENT



IF….ELSE STATEMENT



ARITHMETIC OPERATORS

Operator	Description	Example
+	Adds two operands.	A + B = 30
−	Subtracts second operand from the first.	A − B = -10
*	Multiplies both operands.	A * B = 200
/	Divides numerator by de-numerator.	B / A = 2
%	Modulus Operator and remainder of after an integer division.	B % A = 0
++	Increment operator increases the integer value by one.	A++ = 11
--	Decrement operator decreases the integer value by one.	A-- = 9

```
#include <stdio.h>
 main()
{
 int a = 21; int b = 10; int c ;
c = a + b;
printf("Line 1 - Value of c is %d\n", c );
c = a - b;
printf("Line 2 - Value of c is %d\n", c );
 c = a * b;
printf("Line 3 - Value of c is %d\n", c );
c = a / b;
 printf("Line 4 - Value of c is %d\n", c );
c = a % b;
 printf("Line 5 - Value of c is %d\n", c );
}
```

UNARY OPERATORS IN C

- **Unary operator:** are operators that act upon a single operand to produce a new value.
- **Types of unary operators:**
- unary minus(-)
- increment(++)
- decrement(- -)
- NOT(!)
- Addressof operstor(&)
- sizeof()

```
#include <stdio.h>
int main()
{
int a = 10, b = 100;
float c = 10.5, d = 100.5;
printf("++a = %d \n", ++a);
printf("--b = %d \n", --b);
printf("++c = %f \n", ++c);
printf("--d = %f \n", --d);
return 0;
}
```

SIZEOF OPERATOR

```
#include <stdio.h>
int main()
{
int a;
float b;
double c;
char d;
printf("Size of int=%lu bytes\n",sizeof(a));
printf("Size of float=%lu bytes\n",sizeof(b));
printf("Size of double=%lu bytes\n",sizeof(c));
printf("Size of char=%lu byte\n",sizeof(d));
return 0;
}
```

RELATIONAL OPERATORS

Operator	Description	Example
==	Checks if the values of two operands are equal or not. If yes, then the condition becomes true.	(A == B) is not true.
!=	Checks if the values of two operands are equal or not. If the values are not equal, then the condition becomes true.	(A != B) is true.
>	Checks if the value of left operand is greater than the value of right operand. If yes, then the condition becomes true.	(A > B) is not true.
<	Checks if the value of left operand is less than the value of right operand. If yes, then the condition becomes true.	(A < B) is true.
>=	Checks if the value of left operand is greater than or equal to the value of right operand. If yes, then the condition becomes true.	(A >= B) is not true.
<=	Checks if the value of left operand is less than or equal to the value of right operand. If yes, then the condition becomes true.	(A <= B) is true.

```
#include <stdio.h>
main()
{
 int a = 21; int b = 10; int c ;
 if( a == b )
 {
 printf("Line 1 - a is equal to b\n" );
}
 else
 {
 printf("Line 1 - a is not equal to b\n" );
}
}
```

LOGICAL OPERATORS

Operator	Description	Example
&&	Called Logical AND operator. If both the operands are non-zero, then the condition becomes true.	(A && B) is false.
||	Called Logical OR Operator. If any of the two operands is non-zero, then the condition becomes true.	(A || B) is true.
!	Called Logical NOT Operator. It is used to reverse the logical state of its operand. If a condition is	!(A && B) is true.

```
#include <stdio.h>
main() {
 int a = 5; int b = 20; int c ;
 if ( a && b )
{
 printf("Line 1 - Condition is true\n" );
}
if ( a || b )
 {
printf("Line 2 - Condition is true\n" ); }
```

```
/* lets change the value of a and b */
 a = 0; b = 10;
if ( a && b )
 {
 printf("Line 3 - Condition is true\n" );
}
else
{
printf("Line 3 - Condition is not true\n" );
}
if ( !(a && b) )
 {
printf("Line 4 - Condition is true\n" );
}
}
```

ASSIGNMENT OPERATORS

Operator	Description	Example
=	Simple assignment operator. Assigns values from right side operands to left side operand	C = A + B will assign the value of A + B to C
+=	Add AND assignment operator. It adds the right operand to the left operand and assign the result to the left operand.	C += A is equivalent to C = C + A
-=	Subtract AND assignment operator. It subtracts the right operand from the left operand and assigns the result to the left operand.	C -= A is equivalent to C = C - A
*=	Multiply AND assignment operator. It multiplies the right operand with the left operand and assigns the result to the left operand.	C *= A is equivalent to C = C * A
/=	Divide AND assignment operator. It divides the left operand with the right operand and assigns the result to the left operand.	C /= A is equivalent to C = C / A
%=	Modulus AND assignment operator. It takes modulus using two operands and assigns the result to the left operand.	C %= A is equivalent to C = C % A
<<=	Left shift AND assignment operator.	C <<= 2 is same as C = C << 2
>>=	Right shift AND assignment operator.	C >>= 2 is same as C = C >> 2
&=	Bitwise AND assignment operator.	C &= 2 is same as C = C & 2
^=	Bitwise exclusive OR and assignment operator.	C ^= 2 is same as C = C ^ 2
|=	Bitwise inclusive OR and assignment operator.	C |= 2 is same as C = C | 2

```
#include <stdio.h>
main()
 {
 int a = 21; int c ;
c = a;
printf("Line 1 - = Operator Example, Value of c = %d\n", c );
c += a;
 printf("Line 2 - += Operator Example, Value of c = %d\n", c );
 c -= a;
 printf("Line 3 - -= Operator Example, Value of c = %d\n", c );
c *= a;
printf("Line 4 - *= Operator Example, Value of c =
```

```
c = 200; c %= a;
 printf("Line 6 - %= Operator Example, Value of c = %d\n", c );
 c <<= 2;
 printf("Line 7 - <<= Operator Example, Value of c = %d\n", c );
c >>= 2;
printf("Line 8 - >>= Operator Example, Value of c = %d\n", c );
c &= 2;
 printf("Line 9 - &= Operator Example, Value of c = %d\n", c );
 c ^= 2;
printf("Line 10 - ^= Operator Example, Value of c = %d\n", c );
 c  |= 2;
 printf("Line 11 -  |= Operator Example, Value of c = %d\n", c );
}
```

CONDITIONAL OR TERNARY OPERATORS IN C

- Conditional operators return one value if condition is true and returns another value is condition is false.
- This operator is also called as ternary operator.
- Syntax : (Condition? true_value: false_value);
- Example : (A > 100 ? 0 : 1);

```
#include <stdio.h>

int main()
{
   int x=1, y ;
   y = ( x ==1 ? 2 : 0 ) ;
   printf("x value is %d\n", x);
   printf("y value is %d", y);
}
```

```
#include<stdio.h>

int main()
{
  int age;

  printf(" Please Enter your age here: \n ");
  scanf(" %d ", &age);

 (age >= 18) ? printf(" You are eligible to Vote ") :
               printf(" You are not eligible to Vote ");

 return 0;
}
```

TYPE CONVERSION/TYPE CASTING

- Implicit Type Conversion/ Casting
- Explicit Type Conversion/ Casting

IMPLICIT TYPE CONVERSION/ CASTING

- Implicit type casting means conversion of data types without losing its original meaning.
- This type of typecasting is essential when you want to change data types **without** changing the significance of the values stored inside the variable.
- Implicit type conversion happens automatically when a value is copied to its compatible data type.
- During conversion, strict rules for type conversion are applied.
- If the operands are of two different data types, then an operand having lower data type is automatically converted into a higher data type.

EXAMPLE OF ITC

```
#include<stdio.h>
int main()
{
short a=10; //initializing variable of short data type
        int b; //declaring int variable
        b=a; //implicit type casting
        printf("%d\n",a);
        printf("%d\n",b);
}
```

EXAMPLE OF ITC FROM CHAR TO INT

```
#include<stdio.h>
int main()
{
    int x = 10;    // integer x
    char y = 'a';  // character c

    // y implicitly converted to int. ASCII
    // value of 'a' is 97
    x = x + y;

    // x is implicitly converted to float
    float z = x + 1.0;

    printf("x = %d, z = %f", x, z);
    return 0;
}
```

EXPLICIT TYPE CONVERSION

- When interpretation is between a variable having a data type with respect to size & type both, this conversion is not possible for compiler automatically.
- It is performed by the programmer.
- In this type casting programmer tells compiler to type cast one data type to another data type using type casting operator.
- but there is some risk of information loss is there, so one needs to be careful while doing it.

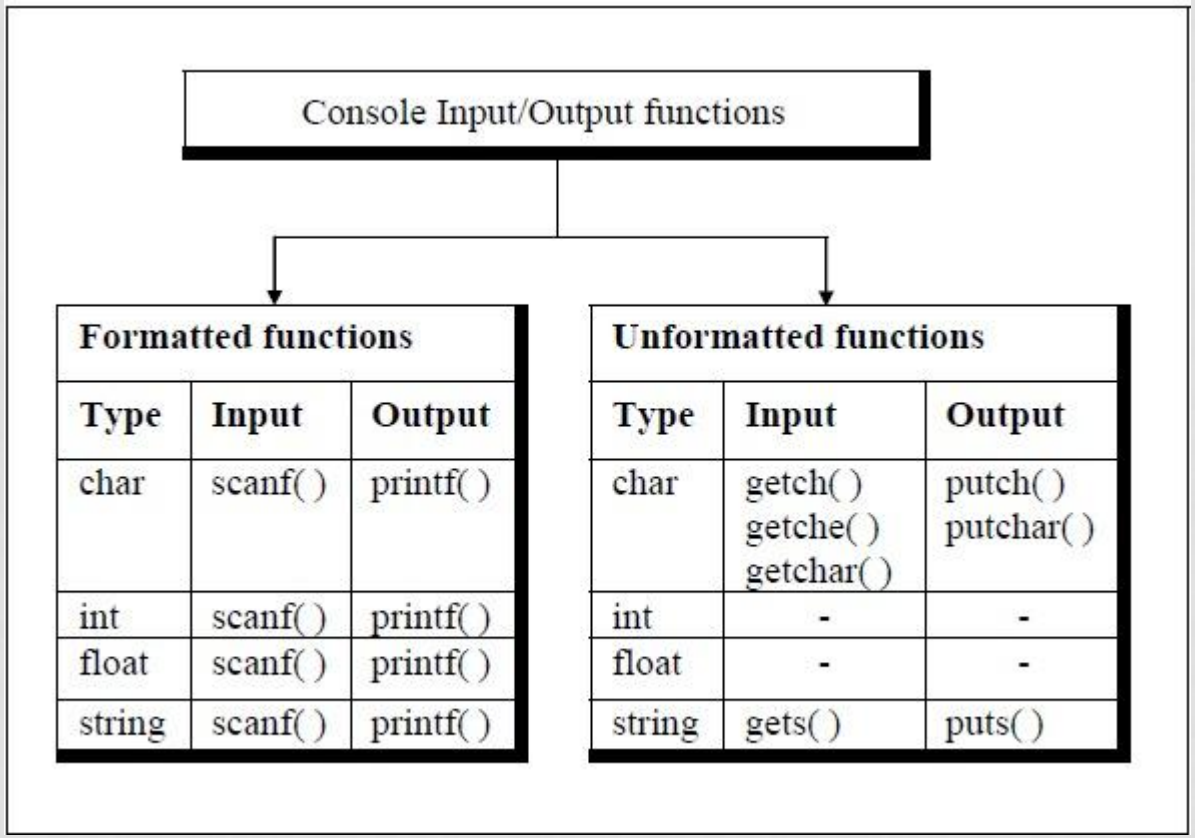
C PROGRAM TO DEMONSTRATE EXPLICIT TYPE CASTING

```
#include<stdio.h>

int main()
{
    double x = 1.2;

    // Explicit conversion from double to int
    int sum = (int)x + 1;

    printf("sum = %d", sum);

    return 0;
}
```

C PROGRAM TO DEMONSTRATE EXPLICIT TYPE CASTING

```
#include<stdio.h>
int main()
{
        float a = 1.2;
        //int b  = a; //Compiler will throw an error for this
        int b = (int)a + 1;
        printf("Value of a is %f\n", a);
        printf("Value of b is %d\n",b);
        return 0;
}
```

INPUT & OUTPUT FUNCTIONS



Formatted functions

Type	Input	Output
char	scanf( )	printf( )
int	scanf( )	printf( )
float	scanf( )	printf( )
string	scanf( )	printf( )

Unformatted functions

Type	Input	Output
char	getch( ) getche( ) getchar( )	putch( ) putchar( )
int	-	-
float	-	-
string	gets( )	puts( )

GETCH() FUNCTION

- The getch() function reads the alphanumeric character input from the user. But, that the entered character will not be displayed.

```
#include <stdio.h>
#include <conio.h>
int main() {
 printf("\nHello, press any alphanumeric character to exit
");
getch();
 return 0; }
```

GETCHE() FUNCTION

- getche() function reads the alphanumeric character from the user input. Here, character you entered will be echoed to the user until he/she presses any key.

```
#include <stdio.h> //header file section
#include <conio.h>
int main() {
 printf("\nHello, press any alphanumeric character or symbol to exit \n ");
 getche();
return 0; }
```

GETCHAR() FUNCTION

- The getchar() function reads character type data form the input.
- The getchar() function reads one character at a time till the user presses the enter key.

```
#include <stdio.h> //header file section #include
<conio.h>
 int main()
{
char c;
 printf("Enter a character : ");
c = getchar();
printf("\nEntered character : %c ", c);
return 0;
 }
```

GETS() FUNCTION

- The gets() function can read a full string even blank spaces presents in a string.
- But, the scanf() function leave a string after blank space space is detected.
- The gets() function is used to get any string from the user.

GETS() FUNCTION

```
#include <stdio.h>
#include <conio.h>
int main()
 {
char c[25];
 printf("Enter a string : ");
gets(c);
printf("\n%s is awesome ",c);
return 0;
}
```

PUTCH() FUNCTION

- The putch() function prints any alphanumeric character.

```
#include <stdio.h> //header file section
 #include <conio.h>
int main() {
char c;
printf("Press any key to continue\n ");
 c = getch();
printf("input : ");
putch(c);
 return 0; }
```

PUTCHAR() FUNCTION

- putchar() function prints only one character at a time.

```
#include <stdio.h> //header file section #include
<conio.h>
int main() {
 char c = 'K';
putchar(c);
return 0;
 }
```

PUTS() FUNCTION

- The puts() function prints the charater array or string on the console. The puts() function is similar to printf() function, but we cannot print other than characters using puts() function.

PUTS() FUNCTION

```
#include <stdio.h>
#include <conio.h>
 int main()
{
char c[25];
 printf("Enter your Name : ");
gets(c);
puts(c);
return 0;
}
```