Variables

- a variable is a container (storage area) to hold data.
- To indicate the storage area, each variable should be given a unique name (identifier).
- Variable names are just the symbolic representation of a memory location.
  - A variable name can have only uppercase and lowercase letters, digits and underscore.
  - int number = 5; // integer variable

Constants

- If you want to define a variable whose value cannot be changed,
  - you can use the **#define or const** keyword. This will create a constant. For example,
    - **#define** double PI = 3.14; **preprocessor directive**

      OR
    - ***const*** *double PI = 3.14;*

C Data Types

- Data types are declarations for variables.
- This determines the type and size of data associated with variables
  - int id; */*id is a variable of type integer.*/*
    - int id, age; **declare multiple variables at once*/*
  - **float** and **double** are used to hold real numbers.
    - float salary;
    - double price;
  - **char** is used for declaring character type variables
    - char test = 'h';
  - long a;
  - long long b;
  - long double c;

bool Type

Enumerated type

Complex types

C Input Output (I/O)

- In C programming, **printf()** is one of the main output function. The function sends formatted output to the screen.
  - printf("C Programming"); /* Displays the string inside quotations */
- To use **printf()** in our program, we need to include stdio.h header file using the **#include <stdio.h>** statement.
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Example 3: float and double Output

```
int main(){
   float number_1 = 11.15;
 double number_2 = 2.43;
    printf("n_1 = %f\n", number1);
  printf("n_2 = %lf", number2);
   return 0;}
```

Example 2: Integer Output

```
int main()
{
    int a= 15;
    printf("Number = %d", a);
    return 0;
}
```

Example 4: Print Characters

```
#include <stdio.h>
int main(){
    char chr = 'a';
printf("character = %c.", chr);
return 0;}
```

- **C Input**
  - **scanf()** is function used to take input from the user.

Example 5: Integer Input/Output

```
#include <stdio.h>
int main(){
  int a;
    printf("Enter an integer: ");
   scanf("%d", &a);
     printf("Number is= %d",a);
  return 0;}
```

Format Specifiers:

- Format specifiers in C are used for input and output
- Using format specifier the compiler can understand that what type of data is in input and output operation.

%i or %d	integer number
%f	float point number
%c	Character
%o	octal number
%x	hexadecimal integer(Lower case letter x)
%X	hexadecimal integer(Upper case letter X)
%e	floating point value with exponent(Lower case letter e)
%E	floating point value with exponent (Upper case letter E)
%g	floating point value with or without exponent
%ld	long integer
%s	String
%lf	double

Escape Sequences

- For example: \n is used for a newline. The backslash \ causes escape from the normal way the characters are handled by the compiler.

Escape sequence	Meaning
\a	Bell
\	Beep
\n	new line
\t	tab horizontal
\b	move the character to left one space
\r	return / enter key
\\	backslash
\’	single quote
\”	double quot

Mathematical functions (math.h)

- preprocessor directives is #include<math.h>.
- Its includes list of mathematical funciton
- **cc abc.c -lm //compilation c file with math funciton**

Function	Description
floor ( )	This function returns the nearest integer which is less than or equal to the argument passed to this function.
round ( )	This function returns the nearest integer value of the float/double/long double argument passed to this function. If decimal value is from ".1 to .5", it returns integer value less than the argument. If decimal value is from ".6 to .9", it returns the integer value greater than the argument.
ceil ( )	This function returns nearest integer value which is greater than or equal to the argument passed to this function.
sin ( )	This function is used to calculate sine value.
sinh ( )	This function is used to calculate hyperbolic sine.
log ( )	This function is used to calculates natural logarithm.
log10 ( )	This function is used to calculates base 10 logarithm.
sqrt ( )	This function is used to find square root of the argument passed to this function.
pow ( )	This is used to find the power of the given number.
trunc ( )	This function truncates the decimal value from floating point value and returns integer value.

Character functions

- preprocessor directives is #include<string.h>.
- Its includes list of mathematical funciton
- **cc abc.c** **//compilation c file with s funciton**

functions	Description
isalpha()	checks whether character is alphabetic
isdigit()	checks whether character is digit
isalnum()	Checks whether character is alphanumeric

islower()	Checks whether character is lower case
isupper()	Checks whether character is upper case
isxdigit()	Checks whether character is hexadecimal
iscntrl()	Checks whether character is a control character

Example 8: ASCII Value

```
#include <stdio.h>
int main(){
    char chr;
  printf("Enter a character: ");
   scanf("%c", &chr);
  printf("You entered %c.\n",chr);
 printf("ASCII value is % d.", chr);

 return 0;}
```