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DATA TYPES:

Data type is the type of data to be stored in the main memory. C language is rich in data types. The Data types in C language can be classified as-

- Primitive Data Types, and
- Non-Primitive data types

Primary Or Primitive Data Types

These data types are predefined in the compiler of C. These data types are also known as *fundamental or built-in* data types. These data types are: int, float, char, double and void. All C compilers support these data types. We can classify these data types into Integer, Real and void types.

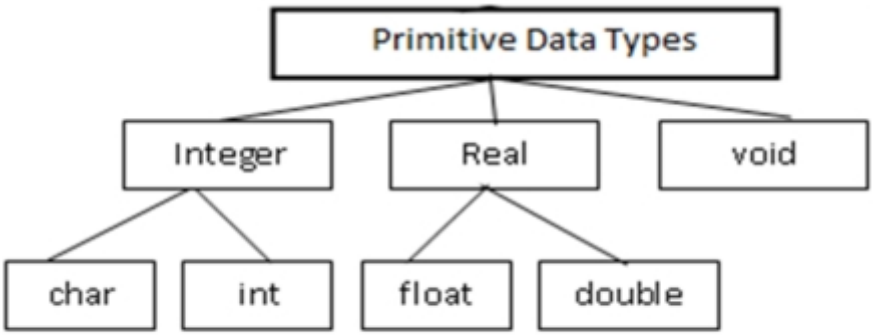

Figure: Primitive Data Types

Following table shows required memory size and the range of values of these data types.

Data Type	Size	Value Range	Range in Decimal	Description
char	1 Byte	-2^7 to 2^7-1	-128 to 127	Stores character value
int	2 Bytes	-2^{15} to $2^{15}-1$	-32768 to 32767	Stores integer value
float	4 Bytes	-2^{31} to $2^{31}-1$	$3.4x10^{-38}$ to $3.4x10^{+38}$	Stores fractional value
Double	8 Bytes	-2^{63} to $2^{63}-1$	$1.7x10^{-308}$ to $1.7x10^{+308}$	Stores fractional value

Table – Size and Range of Basic Data Types in C

char data type:

It is used to store the character data. It takes one byte memory to store value. Its value range is -2^7 to 2^7-1. The range in decimal is -128 to 127. Following program show how to use it:

```
void main( )
{
char ch='A';
printf("%d",ch);                    //shows 65 (ASCII code of A)
printf("%c",ch);                          //shows A
}
```

int data type:

It is used to store the integer data. It takes two bytes memory to store value. Its value range is -2^{15} to $2^{15}-1$. The range in decimal -32768 to 32767. Following program show how to use it:

```
void main( )
{
int a=65;
printf("%d",a);                    //shows 65
}
```

float data type:

It is used to store the single precision fractional data. It takes 4 bytes memory to store value. Its value range is -2^{31} to $2^{31}-1$. The range in decimal $3.4x10^{-38}$ to $3.4x10^{+38}$. Following program show its use:

```
void main( )
{
float a=6.5;
printf("%f",a);                    //shows 6.500000
}
```

double data type:

It is used to store the double precision fractional data. It takes 8 bytes memory to store value. Its value range is -2^{63} to $2^{63}-1$. The range in decimal $1.7x10^{-308}$ to $1.7x10^{+308}$. Following program show how to use it:

```
void main( )
{
double a=6.5;
printf("%lf",a);                   //shows 6.500000
}
```

Void type

The void type has empty or null value. This data type is commonly used with functions. Those functions which do not return any value, have void type.

NON-PRIMITIVE/SECONDARY DATA TYPES

Those data types which are not inbuilt in C, are called non-primitive data types. These data types are: derived, user-defined, and pointers.

Derived Data Type

Those data types which are derived from the basic data types are called derived data types. Arrays, Structure and Union are the derived data types.

User-Defined Data Types

These data types are defined by the user. The 'enum' and 'typedef' are used for this purpose.

Pointers

Pointer is a powerful feature of C language. Pointers are used to store the memory address of a variable.