#3 Data Type Declaration Instruction

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Instruction

Sentences in your program are instructions. They are also known as commands or statements. In C language statements are terminated with a semicolon (;)

Learning instructions will be easier if we categorized them as following:

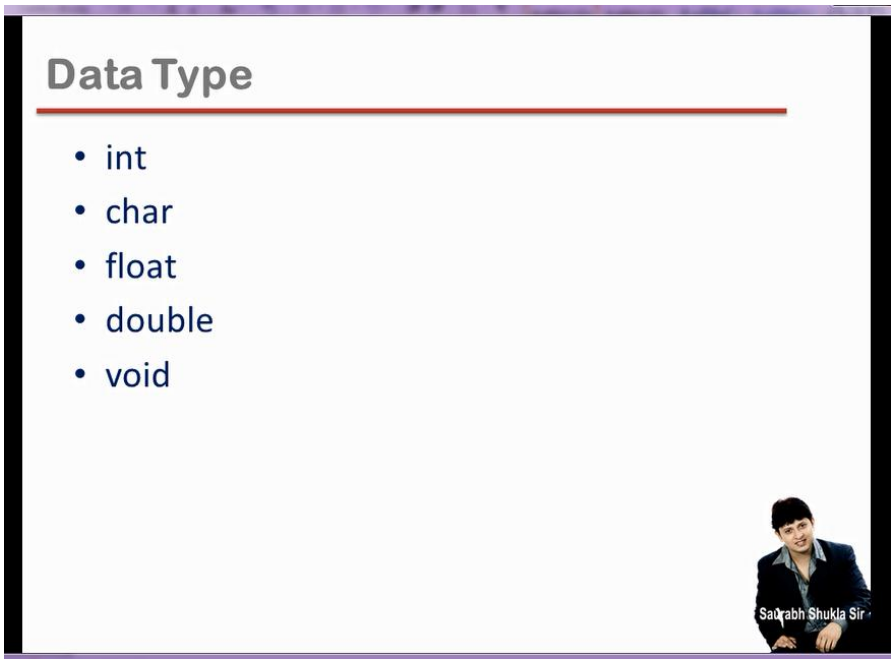
- Data Type Declaration Instruction
- Input Output Instruction
- Arithmetic Instruction
- Control Instruction

Data Type

Program needs data to process. Data comes in wide variety. Phone number is a data, name of a city, person name, account number, etc. are all data. Nature of one data is different from other, like you can add two numbers but cannot add two city names. Similarly, you can capitalize a string but the same operation cannot be applied to numbers.

C language provides few keywords which can be used to tell compiler what kind of data you want to handle. The basis of this classification is:

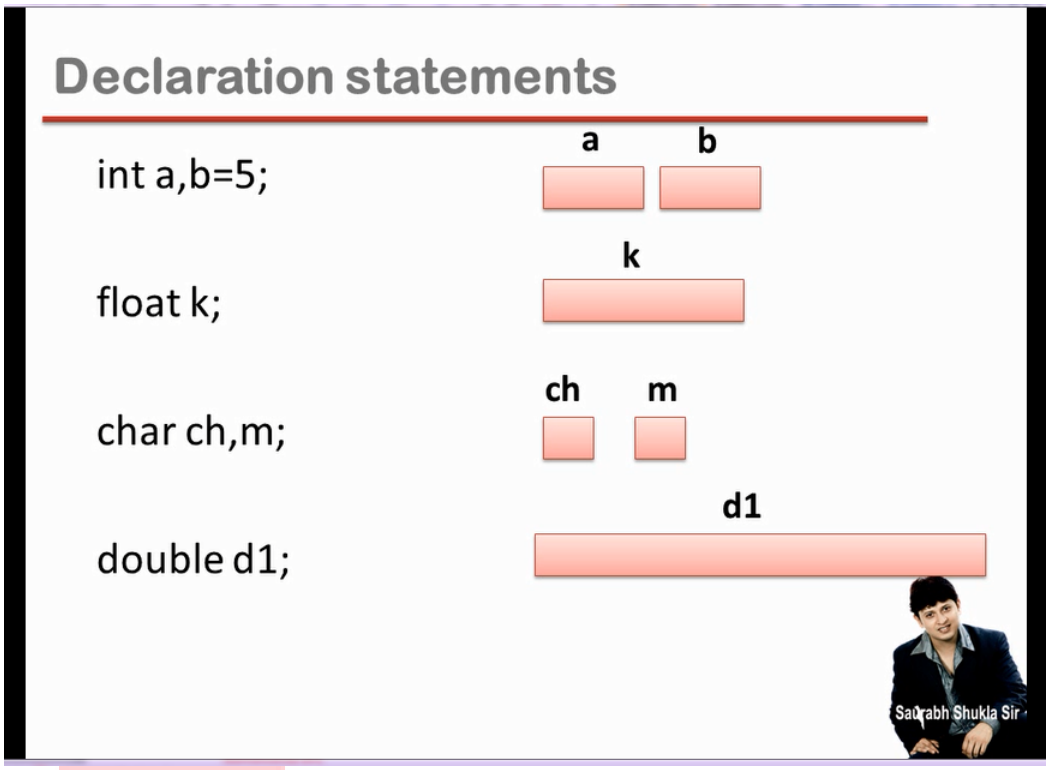
- Kind of operation you can perform on that category of data is different from the kind of operation you can perform on data belongs to different category.
- Amount of space required to represent data in memory



Data types are keywords can be used on various occasions to specify the kind of data. One use of data type is to declare variables.

Data Type Declaration Instruction

Variables are new words in the program and needs to be declared for the compiler. Variables are memory location where you store your data. The kind of data you want to store in the variable should be declared so that compiler fixes the memory requirement. You can do this by using data types.



Variables a and b are of type int, k is of type float, ch and m are of type char and d1 is of type double.

int variable consumes 4 bytes in memory, char variable takes 1 byte, float takes 4 bytes and double takes 8 bytes in memory.

Variable of type int can store integers, char variable is used to store character constant, float and double variables are used to store real constant.

Remember

- double consumes double the amount of space take by float variable, so double variable can store data with high precision as compare to float variable.
- You can initialize variables during declaration, otherwise they contain garbage value.
- void is a data type but you cannot use it to make variables (Later you will learn that it is possible to make pointer variables using void data type. Pointer variables are different from the variables you have just learnt)
- In C language declaration of variables should come before any action statement. All statements except declaration statements are known as action statement.
- char variable consumes 1 byte in memory, it is because they are designed to contain integer value which is a code of assigned character. This coding is known as ASCII (American Standard Code for Information Interchange). For example,
  char x='a';
  In the above statement, x is assigned with a character symbol 'a', whose ASCII code is 97, thus x is assigned a number 97. You can also alternatively write

char x=97;
When you write ASCII code instead of ASCII character, do not enclosed with single quotes.
There are 256 ASCII characters whose codes ranges from 0 to 255.

References

YouTube video links

- Lecture 3 Data Type Declaration Instruction in C
  - https://www.youtube.com/watch?v=HXkuoR63_Ts&feature=youtu.be&list=PL7ersPsTyYt2Q-SqZxTA1D-melSfqBRMW

Exercise

1. Find out the range of values that can be described by each of the data types
2. Find out the memory size consumed by variables of each of the data types
3. What is the difference between char and int
4. What is the difference between double and float
5. What is primitive and non-primitive data types