Datatypes and Variables in C

Keywords

- C has some words that has a special meaning for the compiler
- These words can not be used to name variables, functions etc.

auto	**double**	**int**	**struct**
break	**else**	**long**	**switch**
case	**enum**	**register**	**typedef**
char	**extern**	**return**	**union**
const	**float**	**short**	**unsigned**
continue	**for**	**signed**	**void**
default	**goto**	**sizeof**	**volatile**
do	**if**	**static**	**while**

Variables

- Variables are placeholders
  - They can hold values
- Each variable takes up some memory space
- The values can be assigned, changed, read etc.
- Variables must be defined before using them

Variable Declaration

- First write the keyword for datatype
- Then write the name of the variable
- Example
  - int num=10;
  - char c='a';
  - int i, j, k;
  - float exp=3.25;

Variables

- Name of variable
  - Case sensitive
    - Count, count & COUNT are different
  - Can contain letters, digits and the '_'
  - But first character must be a letter or '_'
  - Variable name cannot be same as a keyword
  - For example –

    correct: abcd, abcd2, abcd_3, Abcd

    incorrect: ab cd, 2abcd, abcd…3, ab!cd

Variables

- Name of variable
  - Should be clear and meaningful
  - If two or more words are needed then either separate them using a '_' or keep them together, but start each word except the first one with a capital
  - For Example –

    student_no average_age

    dateOfBirth averageAge
  - Second way is recommended

Datatypes

- The mostly used data types in C are as follows:
  - int (integer / whole number)
  - float (floating point / fraction)
  - double (double precision float)
  - char (character)

Datatypes

Datatype	Size	Range
unsigned char	8 bits	0 to 255
char	8 bits	-128 to 127
short int	16 bits	-32,768 to 32,767
unsigned int	32 bits	0 to 4,294,967,295
int	32 bits	-2,147,483,648 to 2,147,483,647
unsigned long	32 bits	0 to 4,294,967,295
long	32 bits	-2,147,483,648 to 2,147,483,647
float	32 bits	3.4 * (10**-38) to 3.4 * (10**+38)
double	64 bits	1.7 * (10**-308) to 1.7 * (10**+308)
long double	80 bits	3.4 * (10**-4932) to 1.1 * (10**+4932)

Printing Variables

```
#include <stdio.h>


int main(void)
{
    int num=10;
    printf("num=%d", num);
    return 0;
}
```

Conversion Specifiers

- Integer: %d
- Character : %c
- Float : %f
- Double : %lf

Input numbers from keyboard

```
#include <stdio.h>

int main(void)
{
   int num;
   scanf("%d", &num);
   printf("num=%d", num);
   return 0;
}
```

& (ampersand) :
ADDRESS OPERATOR

Input multiple numbers from keyboard

```
#include <stdio.h>
int main(void) {
    int num1, num2;
    scanf("%d %d", &num1, &num2);
    printf("num=%d", num1+num2);
    return 0;
}
```

- Input must be seperated by space, tab or newline
- Common programming error:
  - Forgetting address operator (&) before variable name in scanf
  - Placing unnecessary characters between conversion specifiers