Variables and Expressions

Lecture 2

Character Set

- Alphabets

  A B C ……Z

  a b c ……z

- Digits

  0 1 2 3 4 5 6 7 8 9

- Special character

  , : . < > {} () [] / \ “” ‘ ! @ # $ % ^ & * + -

- White spaces

  blank space newline vertical tab horizontal tab

Keywords

- Predefined by language
- Cannot be used by programmer anyway other than that specified by syntax
- Must be written in lowercase
- Examples

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

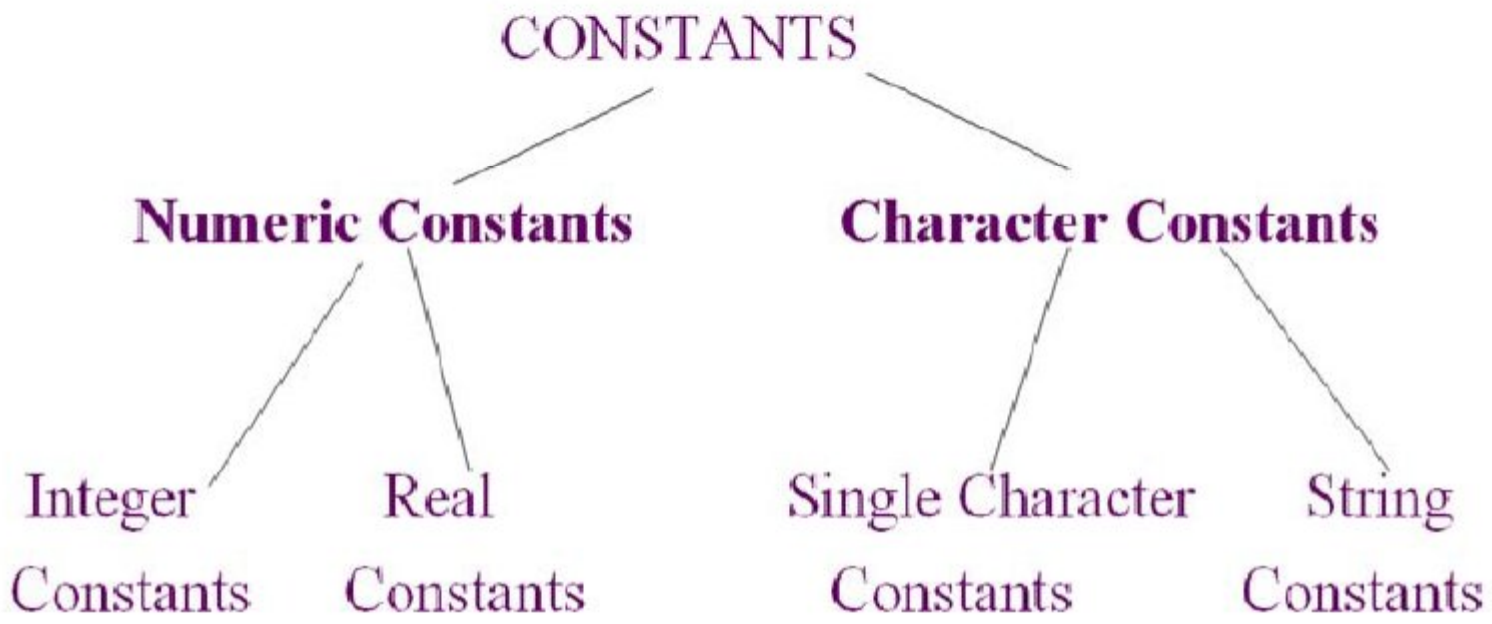
Identifiers

- Used to identify or name variables, constants, functions etc
- Identifiers can be sequence of letters followed by numbers

  x12 area sum ram5 sita
- Identifier can start with underscore : _
- Names should not be same as keywords
- Case sensitive

Constants

- Fixed value that do not change during execution
- Classification



Constants

- Numeric constant refers to sequence of digit
  - Integer constant
    - Set of digits from 0 to 9 precede by – or +
    - eg. 12 , -45, +90 , -50
  - Real constant
    - eg. 2.5, 4.6, -9.7
- Character constant refers to sequence of character
  - Single character constant
    - Contain single character
    - eg. 'a','o','5','.'
  - String constant
    - Sequence of character
    - eg. "ram","456","s","8"

- Escape sequences

printf("hello world.This is my first program");

Output: hello world. This is my first program

printf("hello world. \n This is my first program");

Output: hello world.

This is my first program

- List of escape sequence

\a	alert (bell) character	\\	backslash
\b	backspace	\?	question mark
\f	formfeed	\'	single quote
\n	newline	\"	double quote
\r	carriage return	*ooo*	octal number
\t	horizontal tab	\x*hh*	hexadecimal number
\v	vertical tab		

Variables

- Use to store data value
- Chosen by programmer
- Variable names
  - Variable name can be sequence of letters followed by numbers or underscore
    abc , abc23, a76bh, no90, name_ss, si_int
    3abc is not allowed
  - Variable can start with underscore : _
    _sum, _abc
  - Names should not be same as keywords
    int as variable name is not allowed
  - Case sensitive
    abc ≠ ABC ≠ Abc ≠ aBc
  - White space is not allowed
    abc 123 is not allowed, it should be abc123

Data Type

- Primary Data Types
  - int
  - char
  - float
  - double

- User Defined Data Type
- Secondary / Derived Data Type

Primary Data Type

- Integer Types
  - defined by int
  - Signed and unsigned
  - To control storage space, C has three classes of integer storage namely short int, int and long int

Name	Size
short int	1bytes (8 bits)
int	2bytes
long int	4bytes

Using variable

- Declare Variable

  int a;

- Define Variable

  a=10;

- Initialize Variable

  int a=10;

Scope of variables

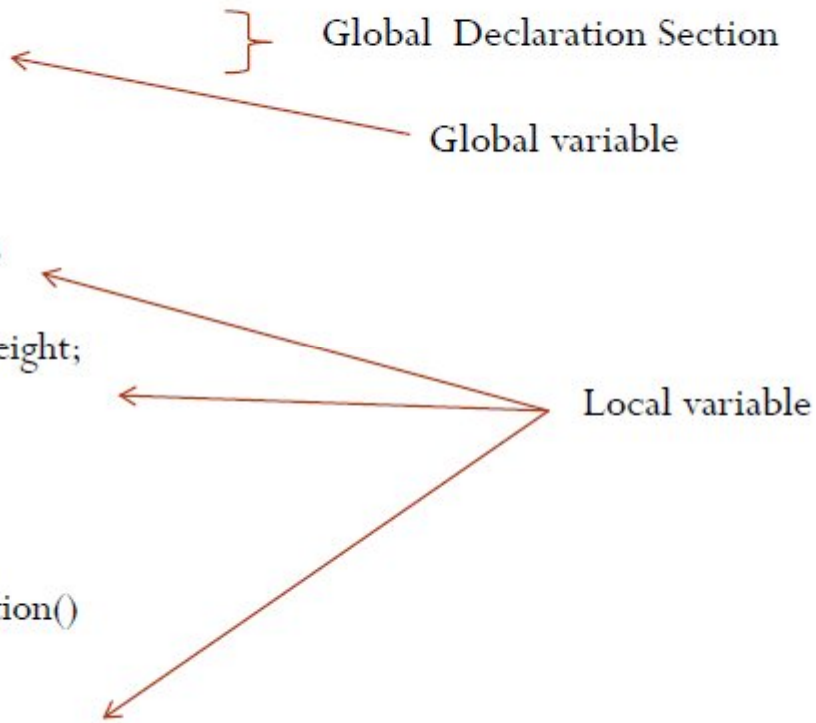
```
#include<stdio.h>

int length;

main()
{
   int width;
   {
        int height;
   }

}

anotherfunction()
{
   int area;
}
```



Printing Integer

- Format specifier for integer is %d or %i

```
int a, b;
a=10;
b=30;
printf("First number : %d \n Second number=%d",a,b);
```

Input Integer

```
int a;
printf("Enter an integer:");
scanf("%d",&a);
```

- Problem : Calculate area of rectangle

```
#include<stdio.h>
main()
{
        int l, b, a;
        printf("Enter length :");
        scanf("%d",&l);
        printf("Enter breadth :");
        scanf("%d",&b);
        a=l*b;
        printf("Area of rectange = %d\n",a);
}
```

Primary Data Type (contd.)

- Character Type
  - defined by char
  - 1 byte memory size
  - Unsigned and signed character
  - Format string for character is %c

Example :

```
char first;
first ='a';
printf("first character :%c",first);
```

Primary Data Type (contd.)

- Floating
  - Define by float
  - Use to store fractional numbers with 6 digit precision
  - 4 bytes size
- Double
  - Define by double
  - Use to store fractional numbers with 14 digit precision

Both float and double do not have signed and unsigned types and format string for float and double is %f