ME 172

Computer Programming Language Sessional

Lecture 2

variables

scanf()

printf()

Data Types and Modifier

- Basic data types are
  - *char*
  - *int*
  - *float*
  - *double*
- Modifiers
  - signed
  - unsigned
  - short
  - Long

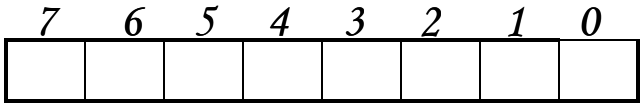
Data Types and Modifier

unsigned char	8 bits	0 to 255
char	8 bits	-128 to 127
unsigned int	16 bits	0 to 65,535
int	16 bits	-32,768 to 32,767
unsigned long	32 bits	0 to 4294967295
long	32 bits	-2147483648 to 2147483647
float	32 bits	$3.4*(10^{-38})$ to $3.4*(10^{+38})$
double	64 bits	$1.7*(10^{-308})$ to $1.7*(10^{+308})$

Bit and Byte

- Each piece of information stored within computer's memory is encoded as some unique combination of zero and ones.
- These 0/1 are called bits.

1 byte = 8 bits.



Variables

- All variables must be declared before they use.
- There are two places variables are declared
  - Variable declared outside all functions called ***Global Variable***, they can be accessed by any function in the program
  - Variable declared inside a function called ***Local Variable,*** that can only be accessed by only the function in which it is declared
- Basic syntax is

  <Type> <Identifier>;
- Example - *int a;*
- Where variables are declared?

- Rules of declaring variables
  - Alphabetic character (a…….z ; A…..Z) , digits (0,1……9), (_) and ($)can only be used in variable name. (*int number*)
  - 1st character must be letter, cannot be digit. (*1_roll*)
  - Both upper and lowercase are permitted
  - No space is allowed in the variable name (*my name*)
  - Keywords are not allowed (*void, int, float etc.*)
  - Variable name should not be greater than 31 char.

Format Specifier

%d	signed decimal Integer
%u	unsigned decimal integer
%ld	long integer
%f	floating point data type
%lf	double data type
%Lf	long double
%e	float data in exponential e notation
%c	single Character
%s	string pointer ,Prints characters until a null-terminator is pressed.
%%	prints the % character

scanf() function

- *scanf* function allows to accept input from standard in, generally the keyboard

➢ General form

  - scanf("format_specifier",&variable);
  - "&variable" means address of the variable

➢ *int age;*

scanf ("%d", &age);

scanf() function

- More example
- *float gpa;*
  scanf ("%f", &gpa);
- *char grade;*
  scanf ("%c", &grade);
- *double number;*
  scanf("%lf", &number);

scanf() function

- More examples
- ```
  #include<stdio.h>
  void main()
  {
  int num;
  float  x;
   scanf ("%d", &num);
   scanf ("%f", &x);

   }
  ```

} *scanf ("%d %f", &num, &x);*
  ```

printf() function

- The *printf* statement allows to send output to standard out; standard out is generally the screen
- printf general form

  printf("format specifier", variable);

printf() function

- Examples
- ```
  #include<stdio.h>
  void main()
  {
  int x = 10;
  printf("%d", x);
  printf("The value of x is %d", x);
  }
  ```
- *Output is*

  10 The value of x is 10
  ```

Escape Sequences

Escape Sequence	Character Value
'\b'	Blank space
'\n'	New line
'\t'	Tab
'\\'	Backslash
'\''	Apostrophe
'\"'	Double quote

Formatted Output

Output of Integer Numbers							% wd
Format	Output						
printf("%d", 9876);	9	8	7	6			
printf("%6d", 9876);	00		9	8	7	6	
printf("%2d", 9876);	9	8	7	6			
printf("%-6d", 9876);	9	8	7	6			
printf("%06d", 9876);	0	0	9	8	7	6	

Formatted Output

Output of Real Numbers	% w.p f	% w.p e
Format (y = 98.7654)	Output	
printf("%7.4f", y);	9 8 . 7 6 5 4	
printf("%7.2f", y);	9 8 . 7 7	
printf("%-7.2f", y);	9 8 . 7 7	
printf("%f", y);	9 8 . 7 6 5 4	
printf("%10.2e", y);	9 . 8 8 e + 0 1	
printf("%11.4e", -y);	- 9 . 8 7 6 5 e + 0 1	
printf("%-10.2e", y);	9 . 8 8 e + 0 1	
printf("%e", y);	9 . 8 7 6 5 4 0 e + 0 1	

Exercise 1

- Write a C program that will take input your student_id, cgpa and Equivalent grade from keyboard and will display the output in the following format

My student id 200810001
My cgpa 3.50
Which Equivalent to A

Hints: use long integer for student id

Exercise 2

- Write a C program that will take input 322.54321 from keyboard and will display the output in the following format

322.54

Exercise 3

- Write a C program that will take input 8976 from keyboard and will display the output in the following format

		8	9	7	6

0	0	8	9	7	6

Exercise 4

- Write a C program that gives the following line as output. Declare three separate variables and use the corresponding format specifiers to print the desired output. The consecutive items should be apart from each other by a space equivalent to one tab.

3.456 99 A

Exercise 4 (do yourself)

- Write a C program that will take input your length and width of a rectangle from keyboard and will display the output in the following format

Area of the rectangle is 50.00

math.h

Some functions of math.h

- pow(b,e)
- sin(x)
- cos(x)
- tan(x)
- log(x)
- log10(x)
- abs(x)

and many others

That's all about today….

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