**Formatted I/O(Input-Output)**

* **Formatted IO** 
  + **Reading a character,**
  + **formatted Input,**
  + **Formatted Output**
* **Introduction of C**
  + C Programming Language: - It is also Called Mother of language.
  + In 1973 Denis Ritchie was Develop C language is a 2nd and 3rd generation of language .C language is provides the low and high level language it’s provides the power of low-level languages and the flexibility and simplicity of high-level languages.
  + C Provides standard functions scanf() and printf(), for performing formatted input and output .These functions accept, as parameters , a format specification string and a list of variables.
  + The format specification string is a character string. Which specifies the data type of each variables to be input or output and the size or width of the input and output.
* **Formatted Output**
  + The function printf() is used for formatted output to standard output based on a format specification.
  + The format specification string, along with the data to be output, are the parameters to the printf() function.
  + Syntax:
    - printf(format, data1, data2,……..);
  + In this syntax format is the format specification string.
  + This string contains, for each variable to be output, a specification beginning with the symbol % followed by a character called the conversion character.
  + Example:
    - printf(“%c”, data1);
  + The character specified after % is called a conversion character because it allows one data type to be converted to another type and printed.
  + See below table conversion character and their meanings.( **Reading a character**)

|  |  |
| --- | --- |
| Conversion  Character | Meaning |
| %d | The data is converted to decimal (integer) |
| %c | The data is taken as a character. |
| %s | The data is a string and character from the string , are printed until a NULL, character is reached. |
| %f | The data is output as float or double with a default  Precision of 6. |

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| Symbols | Meaning |
| \n | For new line(linefeed return) |
| \t | For tab space (equivalent of 8 spaces) |

* + Example
    - printf (“%c\n”,data1);
    - The format specification string may also have text.
  + Example
    - Printf (“Character is:”%c\n”, data1);
    - The text Character is: is printed out along with the value of data1.
  + Example with program

#include<conio.h>

#include<stdio.h>

void main()

{

char alphabh=’A’;

int number1= 55;

float number2=22.34;

clrscr();

printf("char= %c\n",alphabh);

printf("int= %d\n",number1);

printf("float= %f\n",number2);

getch();

}

* + Output Here…
    - char =A
    - int= 55
    - flaot=22.340000
  + A digit following the period: specifying the precision (number of decimal places for numeric data) or the maximum number of characters to be output.
  + Letter 1: To indicate that the data item is a long integer and not an int.

|  |  |  |
| --- | --- | --- |
| Format specification string | Data | Output |
| |%2d| | 9 | |9| |
| |%2d| | 123 | |123| |
| |%03d| | 9 | |009| |
| |%-2d| | 7 | |7| |
| |%5.3d| | 2 | |002| |
| |%3.1d| | 15 | |15| |
| |%3.5d| | 15 | |0015| |
| |%5s| | “Output sting” | |Output string| |
| |%15s| | “Output sting” | |Output string| |
| |%-15s| | “Output sting” | |Output string| |
| |%15.5s| | “Output sting” | |Output string| |
| |%.5s| | “Output sting” | |Output| |
| |%-15.5s| | “Output sting” | |Output| |
| |%f| | 87.65 | |87.650000| |
| |%4.1f| | 87.65 | |87.71| |

* + Example based on the conversion character:

#include<stdio.h>

#include<conio.h>

void main()

{

int num=65;

clrscr();

printf("Value of num is : %d\n:", num);

printf("Character equivalent of %d is %c\n", num , num);

getch();

}

* + - Output Here Below….
      * Value of num is: 65
      * Character equivalent of 65 is A
* **Formatted Input**
  + The function scanf() is used for formatted input from standard input and providers many of the conversion facilities of the function printf().
  + Syntax
    - scanf (format, num1,num2,……);
  + The function scnaf() reads and converts characters from the standards input according to the format specification string and stores the input in memory locations represented by the other arguments(num1, num2,….).
  + For Example:
    - scanf(“ %c %d”,&Name, &Roll No);
  + Note:-that the data names are listed as &Name and &Roll No instead of Name and Roll No respectively .this is how data names are specified in a scnaf() function. in case of string type data names , the data name is not preceded by the character &.
  + Example with program
    - Write a function to accept and display the element number and the weight of a proton. The element number is an integer and weight is fractional.

#include<stdio.h>

#include<conio.h>

void main()

{

int e\_num;

float e\_wt;

printf ("Enter the Element No. and Weight of a Proton\n");

scanf ("%d %f",&e\_num, &e\_wt);

printf ("The Element No.is:",e\_num);

printf ("The Weight of a Proton is: %f\n",e\_wt);

getch();

}