

SCAD ENGINEERING COLLEGE,CHERANMAHADEVI

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

GE6151 COMPUTER PROGRAMMING

**(2 MARKS AND 16 MARKS QUESTION WITH
ANSWERS)**

**PREPARED BY
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GE6151 Computer Programming Question Bank

UNIT I – INTRODUCTION

PART A (2 MARKS)

1. Define computers?

A computer is a programmable machine or device that performs pre-defined or programmed computations or controls operations that are expressible in numerical or logical terms at high speed and with great accuracy.

(Or)

Computer is a fast operating electronic device, which automatically accepts and store input data, processes them and produces results under the direction of step by step program.

2. What are the basic operations of Computer?

- ✓ It accepts data or instructions by way of input.
- ✓ It stores data.
- ✓ It can process data as required by the user.
- ✓ It gives results in the form of output.
- ✓ It controls all operations inside a computer.

3. What are the characteristics of computers? (JAN 2009)

- ✓ Speed
- ✓ Accuracy.
- ✓ Automation.
- ✓ Endurance.
- ✓ Versatility.
- ✓ Storage.
- ✓ Cost Reduction.

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4. How will you classify computer systems? (JAN2009)

Based on physical size, performance and application areas, we can generally divide computers into four major categories:

- ✓ Micro computer
- Mini Computer
- ✓ Mainframe computer and
- ✓ Super Computer

5. Expand ENIAC, ABC, EDVAC, EDSAC and UNIVAC. (JAN2010)

ENIAC – Electronic Numerical Integrator and Calculator.

ABC – Atanasoff and Berry Computer.

EDVAC – Electronic Discrete Variable Automatic Calculator.

EDSAC – Electronic Delay Storage Automatic Calculator.

UNIVAC – UNiversal Automatic Computer.

6. What are the components of the computer systems?

Basic components of the computer system are Input Unit, Central Processing Unit, Secondary Storage Unit and Output Unit.

7. What is an ALU?

Arithmetic logic unit, the part of a computer that performs all arithmetic computations, such as addition and multiplication, and all logical operations such as comparison operations. The ALU is one component of the CPU (central processing unit).

8. What are the functions in the input unit?

An input device is a device that is used to input data or information into a computer. Some examples of input devices include:

- ✓ Keyboards, mouse.
- ✓ Light Pen.
- ✓ Digitizer.
- ✓ Touchpad.
- ✓ Speakers.
- ✓ Printer.
- ✓ Headphone

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9. What are the functions in the output unit?

In computers, a unit which delivers information from the computer to an external device or from internal storage to external storage.

10. Define Mainframe computer?

Mainframes are computers used mainly by large organizations for critical applications, typically bulk data processing such as census, industry and consumer statistics, enterprise resource planning, and financial processing. The term probably had originated from the early mainframes, as they were housed in enormous, room-sized metal boxes or frames.

11. Define super computer?

The fastest type of computer. Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations. For example, weather forecasting requires a supercomputer. Other uses of supercomputers include animated graphics, fluid dynamic calculations, nuclear energy research, and petroleum exploration.

12. What is a volatile and non-volatile memory?

Volatile memory: also known as volatile storage is computer memory that requires power to maintain the stored information, unlike non-volatile memory which does not require a maintained power supply. It has been less popularly known as temporary memory.

Non-volatile memory: nonvolatile memory, NVM or non-volatile storage, is computer memory that can retain the stored information even when not powered.

13. Write the binary and octal equivalent of hexadecimal number 7BD? (APR2009)

Binary Equivalent of 7BD = (0111 1011 1101)₂

Octal Equivalent of 7BD = (011 110 111 101) = (3675)₈

14. Convert binary number 100110 into its octal equivalent? (JAN2009)

Octal equivalent of 100110 = (100 110) = (46)₈

15. What are registers? (JAN2009)

A special, high-speed storage area within the CPU. All data must be represented in a register before it can be processed.

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For example, if two numbers are to be multiplied, both numbers must be in registers, and the result is also placed in a register.

16. Differentiate analog and digital computers? (JAN2010)

Analog Computer Digital Computer

- ✓ Process measured data Process discrete data
- ✓ Analog computers are not precise Digital computers are more precise
- ✓ Processing speed is low. Processing speed is high.
- ✓ Less accuracy. More accuracy.

17. Find the decimal equivalent of hexadecimal number 4D.C8 (JAN2010)

$$4D.C8 = 4 \times 16^1 + 13 \times 16^0 + 12 \times 16^{-1} + 8 \times 16^{-2}$$
$$= 64 + 13 + 0.75 + 0.03125 = (77.78)_{10}$$

18. Convert hexadecimal number into binary equivalent of EBC (JAN2010)

Binary equivalent of EBC = (1110 1011 1100)₂

19. What is algorithm? (JAN2009)

Algorithm means the logic of a program. It is a step-by-step description of how to arrive at a solution of a given problem.

20. What are the steps to solve the problem in a computer system?

- ✓ Problem must be analyzed thoroughly.
- ✓ Solution method is broken down into a sequence of small tasks.
- ✓ Based on this analysis, an algorithm must be prepared to solve the problem.
- ✓ The algorithm is expressed in a precise notation. This notation is known as "Computer Program".
- ✓ The Computer program is fed to the computer.
- ✓ The instruction in the program executes one after another and outputs the expected result.

21. What are the characteristics of an algorithm?

- ✓ In algorithms each and every instruction should be precise.
 - ✓ In algorithms each and every instruction should be unambiguous.
-

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- ✓ The instructions in an algorithm should not be repeated infinitely.
- ✓ Ensure that the algorithm will ultimately terminate.
- ✓ The algorithm should be written in sequence.
- ✓ It looks like normal English.

22. What is Flowchart?

A Flowchart is a pictorial representation of an algorithm. It is often used by programmer as a program planning tool for organizing a sequence of step necessary to solve a problem by a computer.

23. What is the need of Flowchart symbols?

Each symbol of different shapes denotes different shapes denote different types of instructions. The program logic through flowcharts is made easier through the use of symbol that has standardized planning.

24. What is pseudo code?

“Pseudo” means imitation of false and “code” refers to the instruction written in the programming language. Pseudo code is programming analysis tool that is used for planning program logic.

UNIT-II

2 MARKS

1. Define Compilation process.

Compilation refers to the processing of source code files (.c, .cc, or .cpp) and the creation of an 'object' file. This step doesn't create anything the user can actually run. Instead, the compiler merely produces the machine language instructions that correspond to the source code file that was compiled.

2. What do you meant by linking?

Linking refers to the creation of a single executable file from multiple object files. In this step, it is common that the linker will complain about undefined functions (commonly, main itself). During compilation, if the compiler could not find the definition for a particular function, it would just assume that the function was defined in another file. If this isn't the case, there's no way the compiler would know it doesn't look at the contents of more than one file at a time. The linker, on the other hand, may look at multiple files and try to find references for the functions that weren't mentioned.

3. Define Constants in C. Mention the types.

The constants refer to fixed values that the program may not alter during its execution. These fixed values are also called **literals**.

Constants can be of any of the basic data types like *an integer constant, a floating constant, a character constant, or a string literal*. There are also enumeration constants as well.

The **constants** are treated just like regular variables except that their values cannot be modified after their definition.

4. What are the different data types available in 'C'?

There are four basic data types available in 'C'.

1. int
2. float
3. char

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4. double

5. What is meant by Enumerated data type.

Enumerated data is a user defined data type in C language.

Enumerated data type variables can only assume values which have been previously declared.

Example :

```
enum month { jan = 1, feb, mar, apr, may, jun, jul, aug, sep, oct, nov, dec };
```

6. What are Keywords?

Keywords are certain reserved words that have standard and pre-defined meaning in 'C'. These keywords can be used only for their intended purpose.

7. What do you mean by variables in 'C'?

- ✓ A variable is a data name used for storing a data value.
- ✓ Can be assigned different values at different times during program execution.
- ✓ Can be chosen by programmer in a meaningful way so as to reflect its function in the program.
- ✓ Some examples are: Sum

8. Difference between Local and Global variable in C.

Local

These variables only exist inside the specific function that creates them. They are unknown to other functions and to the main program. As such, they are normally implemented using a stack. Local variables cease to exist once the function that created them is completed. They are recreated each time a function is executed or called.

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Global

These variables can be accessed (ie known) by any function comprising the program. They are implemented by associating memory locations with variable names. They do not get recreated if the function is recalled.

9. What are Operators? Mention their types in C.

An operator is a symbol that tells the compiler to perform specific mathematical or logical manipulations. C language is rich in built-in operators and provides following type of operators:

- Arithmetic Operators
- Relational Operators
- Logical Operators
- Bitwise Operators
- Assignment Operators
- Misc Operators

10. What is the difference between '=' and '==' operator?

Where = is an assignment operator and == is a relational operator.

Example:

while (i=5) is an infinite loop because it is a non zero value and while (i==5) is true only when i=5.

11. What is type casting?

Type casting is the process of converting the value of an expression to a particular data type.

Example:

```
int x,y;
```

```
c = (float) x/y; where a and y are defined as integers. Then the result of x/y is converted into float.
```

12. What is the difference between ++a and a++?

++a means do the increment before the operation (pre increment)

a++ means do the increment after the operation (post increment)

Example:

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```
a=5;
x=a++; /* assign x=5*/ y=a;
/*now y assigns y=6*/
x=++a; /*assigns x=7*/
```

13.Distinguish between while..do and do..while statement in C. (JAN 2009)

While	DO..while
(i) Executes the statements within the while block if only the condition is true.	(i) Executes the statements within the while block at least once.
(ii) The condition is checked at the starting of the loop	(ii) The condition is checked at the end of the loop

14.Mention the various Decisions making statement available in C.

Statement	Description
if statement	An if statement consists of a boolean expression followed by one or more statements.
if...else statement	An if statement can be followed by an optional else statement , which executes when the boolean expression is false.
nested if statements	You can use one if or else if statement inside another if or else if statement(s).
switch statement	A switch statement allows a variable to be tested for equality against a list of values.
nested switch statements	You can use one switch statement inside another switch statement(s).

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15. What do you mean by conditional or ternary operator?

? : If Condition is true ? Then value X : Otherwise value Y

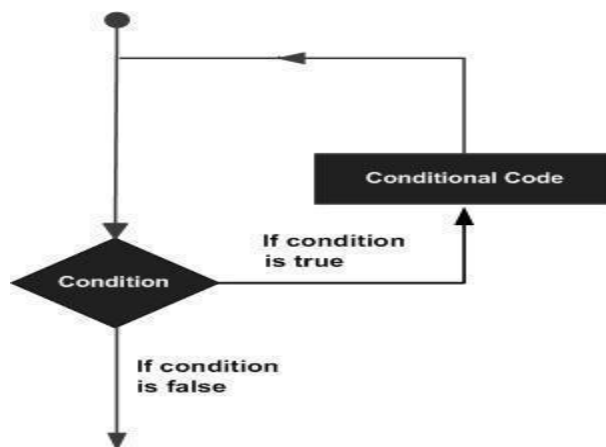
16. What is the use of sizeof() operator in C.

Sizeof operator is used to return the size of an variable.

Example : sizeof(a), Where a integer, will return 4.

17. Define Looping in C .

A loop statement allows us to execute a statement or group of statements multiple times and following is the general form of a loop statement in most of the programming languages:



18. What are the types of looping statements available in C

C programming language provides following types of loop to handle looping requirements. Click the following links to check their detail.

Loop Type

Description

while loop

Repeats a statement or group of statements while a given condition is true. It tests the condition before executing the loop body.

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for loop	Execute a sequence of statements multiple times and abbreviates the code that manages the loop variable.
do...while loop	Like a while statement, except that it tests the condition at the end of the loop body
nested loops	You can use one or more loop inside any another while, for or do..while loop.

19. What are the types of I/O statements available in 'C'?

There are two types of I/O statements available in 'C'.

- ✓ Formatted I/O Statements
- ✓ Unformatted I/O Statements

20. Write short notes about main () function in 'C' program. (MAY 2009)

- ✓ Every C program must have main () function.
- ✓ All functions in C, has to end with '(')' parenthesis.
- ✓ It is a starting point of all 'C' programs.
- ✓ The program execution starts from the opening brace '{' and ends with closing brace '}',

within which executable part of the program exists.

21. Define delimiters in 'C'.

Delimiters Use

: Colon

; Semicolon

() Parenthesis

[] Square Bracket

{ } Curly Brace

Hash

, Comma

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22. Why header files are included in 'C' programming?

· This section is used to include the function definitions used in the program. · Each header file has 'h' extension and include using '#include' directive at the beginning of a program.

23. What is the output of the programs given below?

```
main()
{
float a;
int x=6, y=4;
a=x\y;
printf("Value of a=%f", a);
}
```

Output:

1. 1.500000

```
main()
{
float a;
int x=6, y=4;
a=(float) x\y;
printf("Value of a=%f",a);
}
```

Output:

24. What is the difference between scanf() and gets() function?

In scanf() when there is a blank was typed, the scanf() assumes that it is an end. gets() assumes the enter key as end. That is gets() gets a new line (\n) terminated string of characters from the keyboard and replaces the '\n' with '\0'.

25. What are the Escape Sequences present in 'C'?

\n - New Line \b
- Backspace \t -
Form feed \f
- Single quote \'
- Backspace \t -
Tab
\r - Carriage return
\a - Alert
\" - Double quotes

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26.What is the difference between if and while statement?

If	While
(i) It is a conditional statement	(i) It is a loop control statement
(ii) If the condition is true, it executes some statements.	(ii) Executes the statements within the while block if the condition is true.
(iii) If the condition is false then it stops the execution the statements.	(iii) If the condition is false the control is transferred to the next statement of the loop.

27.Differentiate between formatted and unformatted you input and output functions?

Formatted I/P functions:

These functions allow us to supply the input in a fixed format and let us obtain the output in the specified form. Formatted output converts the internal binary representation of the data to ASCII characters which are written to the output file.

Unformatted I/O functions:

There are several standard library functions available under this category-those that can deal with a string of characters. Unformatted Input/Output is the most basic form of input/output. Unformatted input/output transfers the internal binary representation of the data directly between memory and the file.

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UNIT –III

2 MARKS

1. What is an array?

An array is a group of similar data types stored under a common name. An array is used to store a collection of data, but it is often more useful to think of an array as a collection of variables of the same type.

Example:

```
int a[10];
```

Here a[10] is an array with 10 values.

2. What are the main elements of an array declaration?

- ✓ Array name
- ✓ Type and
- ✓ Size

3. How to initialize an array?

You can initialize array in C either one by one or using a single statement as follows:

```
double balance[5] = {1000.0, 2.0, 3.4, 17.0, 50.0};
```

The number of values between braces { } cannot be larger than the number of elements that we declare for the array between square brackets []. Following is an example to assign a single element of the array:

4. Why is it necessary to give the size of an array in an array declaration?

When an array is declared, the compiler allocates a base address and reserves enough space in the memory for all the elements of the array. The size is required to allocate the required space. Thus, the size must be mentioned.

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5. What is the difference between an array and pointer?

Difference between arrays and pointers are as follows.

Array	Pointer
Array allocates space automatically	1.Pointer is explicitly assigned to point to an allocated space.
2.It cannot be resized.	2.It can be resized using realloc ().
3.It cannot be reassigned.	3.Pointers can be reassigned.
4.Size of(array name) gives the number of bytes occupied by the array.	4.Sezeof(pointer name) returns the number of bytes used to store the pointer variable.

6. List the characteristics of Arrays.

All elements of an array share the same name, and they are distinguished from one another with help of an element number. Any particular element of an array can be modified separately without disturbing other elements.

7. What are the types of Arrays?

- 1.One-Dimensional Array
2. Two-Dimensional Array
3. Multi-Dimensional Array

8. Define Strings.

Strings:

The group of characters, digit and symbols enclosed within quotes is called as String (or) character Arrays. Strings are always terminated with '\0' (NULL) character. The compiler automatically adds '\0' at the end of the strings.

Example:

```
char name[]={ 'C', 'O', 'L', 'L', 'E', 'G', 'E', 'E', '\0' };
```

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9. Mention the various String Manipulation Functions in C.

S.N.	Function & Purpose
1	strcpy(s1, s2); Copies string s2 into string s1.
2	strcat(s1, s2); Concatenates string s2 onto the end of string s1.
3	strlen(s1); Returns the length of string s1.
4	strcmp(s1, s2); Returns 0 if s1 and s2 are the same; less than 0 if s1<s2; greater than 0 if s1>s2.
5	strchr(s1, ch); Returns a pointer to the first occurrence of character ch in string s1.
6	strstr(s1, s2); Returns a pointer to the first occurrence of string s2 in string s1.

10. What is the use of atoi() function?

C allows us to manipulate characters the same way we do with numbers. Whenever a character constant or character variable is used in an expression, it is automatically converted into integer value by the system.

For eg, if the machine uses the ASCII representation, then,

```
x = 'a'; printf(“%d \n”,x);
```

will display the number 97 on the screen.

The C library supports a function that converts a string of digits into their integer values. The function takes the form

```
x = atoi(string)
```

11. What is the use of ‘typedef’?

It is used to create a new data using the existing type.

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Syntax: typedef data type name;

Example:

```
typedef int hours; /* Now, hours can be used as new datatype */
```

12. What is meant by Sorting?

Sorting refers to ordering data in an increasing or decreasing fashion according to some linear relationship among the data items. Sorting can be done on names, numbers and records.

13. What are the types of sorting available in C?

Insertion sort.

Merge Sort.

Quick Sort.

Radix Sort.

Heap Sort

Selection sort

Bubble sort

14. Define Heap Sort.

A sorting algorithm that works by first organizing the data to be sorted into a special type of binary tree called a heap. The heap itself has, by definition, the largest value at the top of the tree, so the heap sort algorithm must also reverse the order. It does this with the following steps:

1. Remove the topmost item (the largest) and replace it with the rightmost leaf. The topmost item is stored in an array.
2. Re-establish the heap.
3. Repeat steps 1 and 2 until there are no more items left in the heap.

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15. Define Bubble sort.

A simple but popular sorting algorithm. Bubble sorting is used frequently as a programming exercise because it is relatively easy to understand. It is not, however, particularly efficient. Other sorting algorithms, such as heap sorts, merge sorts and quick sorts, are used more often in real applications.

16. Define Searching.

Searching for data is one of the fundamental fields of computing. Often, the difference between a fast program and a slow one is the use of a good algorithm for the data set. Naturally, the use of a hash table or binary search tree will result in more efficient searching, but more often than not an array or linked list will be used. It is necessary to understand good ways of searching data structures not designed to support efficient search.

17. Mention the various types of searching techniques in C

✓ Linear search

✓ Binary search

18. What is linear search?

In Linear Search the list is searched sequentially and the position is returned if the key element to be searched is available in the list, otherwise -1 is returned. The search in Linear Search starts at the beginning of an array and move to the end, testing for a match at each item.

19. What is Binary search?

A binary search, also called a dichotomizing search, is a digital scheme for locating a specific object in a large set. Each object in the set is given a key. The number of keys is always a power of 2. If there are 32 items in a list, for example, they might be numbered 0 through 31 (binary 00000 through 11111). If there are, say, only 29 items, they can be numbered 0 through 28 (binary 00000 through 11100), with the numbers 29 through 31 (binary 11101, 11110, and 11111) as dummy keys.

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UNIT IV 2 MARKS

1. What are functions in C?

A function is a group of statements that together perform a task. Every C program has at least one function which is **main()**, and all the most trivial programs can define additional functions.

2. How will define a function in C?

Defining a Function:

The general form of a function definition in C programming language is as follows:

```
return_type function_name( parameter list )  
{  
    body of the function  
}
```

A function definition in C programming language consists of a *function header* and a *function body*. Here are all the of a function:

- ✓ Return Type ✓
- Function Name
- ✓ Parameters
- Function Body

3. What are the steps in writing a function in a program?

a) Function Declaration (Prototype declaration):

Every user-defined functions has to be declared before the main().

b) Function Callings:

The user-defined functions can be called inside any functions like main(),user-defined function, etc.

c) Function Definition:

4.What is the purpose of the function main()? (MAY 2009)

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The function main () invokes other functions within it. It is the first function to be called when the program starts execution.

5. Is it better to use a macro or a function?

Macros are more efficient (and faster) than function, because their corresponding code is inserted directly at the point where the macro is called. There is no overhead involved in using a macro like there is in placing a call to a function.

However, macros are generally small and cannot handle large, complex coding constructs. In cases where large, complex constructs are to be handled, functions are more suited, additionally; macros are expanded inline, which means that the code is replicated for each occurrence of a macro.

6. Distinguish between Call by value and Call by reference.

Call by value	Call by reference.
a) In call by value, the value of actual arguments is passed to the formal arguments and the operation is done on formal arguments.	a) In call by reference, the address of actual argument values is passed to formal argument values.
b) Formal arguments values are photocopies of actual arguments values.	b) Formal arguments values are pointers to the actual argument values.
c) Changes made in formal arguments values do not affect the actual arguments values.	c) Since Address is passed, the changes made in the both arguments values are permanent

7. What is meant by Recursive function?

If a function calls itself again and again, then that function is called Recursive function.

Example:

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```
void recursion()
{
    recursion(); /* function calls itself */
}

int main()
{
    recursion();
}
```

8. Write a C program for factorial using recursion function.

Following is an example which calculates factorial for a given number using a recursive function:

```
#include <stdio.h>

int factorial(unsigned int i)
{
    if(i <= 1)
    {
        return 1;
    }
    return i * factorial(i - 1);
}

int main()
{
    int i = 15;
    printf("Factorial of %d is %d\n",
        i, factorial(i)); return 0;
}
```

When the above code is compiled and executed, it produces the following result:

```
Factorial of 15 is 2004310016
```

9. What is dynamic memory allocation?

Allocating the memory at run time is called as dynamic memory allocation.

10. What are the various dynamic memory allocation functions?

malloc() - Used to allocate blocks of memory in required size of bytes.

free() - Used to release previously allocated memory space.

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calloc() - Used to allocate memory space for an array of elements.

realloc() - Used to modify the size of the previously allocated memory space.

11. What is a Pointer? How a variable is declared to the pointer? (MAY 2009)

Pointer is a variable which holds the address of another variable.

Pointer Declaration:

datatype *variable-name;

Example:

```
int *x, c=5;
```

```
x=&a;
```

12. What are the uses of Pointers?

Pointers are used to return more than one value to the function

- Pointers are more efficient in handling the data in arrays
- Pointers reduce the length and complexity of the program
- They increase the execution speed
- The pointers save data storage space in memory

13. What is the output of the program?

```
main()                                junk(int i, int j)
{                                       {
int i=5;j=2;                            i=i*j;
junk(i,j);                               j=i*j;
printf("\n %d %d",i,j);                 }
}
```

Output:

1. 2

2.

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14. What are * and & operators means?

'*' operator means 'value at the address'

'&' operator means 'address of'

15. What is dangling pointer?

In C, a pointer may be used to hold the address of dynamically allocated memory. After this memory is freed with the free() function, the pointer itself will still contain the address of the released block. This is referred to as a dangling pointer. Using the pointer in this state is a serious programming error. Pointer should be assigned NULL after freeing memory to avoid this bug.

16. What is meant by Recursive function?

If a function calls itself again and again, then that function is called Recursive function.

Example:

```
void recursion()
{
    recursion(); /* function calls itself */
}

int main()
{
    recursion();
}
```

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{
    if(i <= 1)
    {
        return 1;
    }
}
```

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```
    return i * factorial(i - 1);
}
int main()
{
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}
```

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UNIT V 2 MARKS

1. Compare arrays and structures.

Comparison of arrays and structures is as follows.

Arrays	Structures
An array is a collection of data items of same data type. Arrays can only be declared.	A structure is a collection of data items of different data types. Structures can be declared and defined.
There is no keyword for arrays.	The keyword for structures is struct.
An array name represents the address of the starting element.	A structure name is known as tag. It is a Shorthand notation of the declaration.
An array cannot have bit fields.	A structure may contain bit fields.

2. Compare structures and unions.

Structure	Union
Every member has its own memory.	All members use the same memory.
The keyword used is struct.	The keyword used is union.
All members occupy separate memory location, hence different interpretations of the same memory location are not possible. Consumes more space compared to union.	Different interpretations for the same memory location are possible. Conservation of memory is possible

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3. Define Structure in C.

C Structure is a collection of different data types which are grouped together and each element in a C structure is called member.

If you want to access structure members in C, structure variable should be declared.

Many structure variables can be declared for same structure and memory will be allocated for each separately.

It is a best practice to initialize a structure to null while declaring, if we don't assign any values to structure members.

4. What you meant by structure definition?

A structure type is usually defined near to the start of a file using a typedef statement. typedef defines and names a new type, allowing its use throughout the program. typedefs usually occur just after the #define and #include statements in a file.

Here is an example structure definition.

```
typedef struct { char
    name[64];
    char course[128];
    int age;
    int year;
} student;
```

This defines a new type student variables of type student can be declared as follows.

```
student st_rec;
```

5. How to Declare a members in Structure?

A **struct** in C programming language is a structured (record) type [\[1\]](#) that aggregates a fixed set of labeled objects, possibly of different types, into a single object. The syntax for a struct declaration in C is:

GE6151 Computer Programming Question Bank

```
struct tag_name
{
    type attribute;
    type attribute2;
    /* ... */
};
```

6. What is meant by Union in C.?

A **union** is a special data type available in C that enables you to store different data types in the same memory location. You can define a union with many members, but only one member can contain a value at any given time. Unions provide an efficient way of using the same memory location for multi-purpose.

7. How to define a union in C.

To define a union, you must use the **union** statement in very similar was as you did while defining structure. The union statement defines a new data type, with more than one member for your program. The format of the union statement is as follows:

```
union [union tag]
{
    member definition;
    member definition;
    ...
    member definition;
} [one or more union variables];
```

8. How can you access the members of the Union?

To access any member of a union, we use the **member access operator** (.). The member access operator is coded as a period between the union variable name and the union member that we wish to access. You would use **union** keyword to define variables of union type.

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9. What are the pre-processor directives?

Macro Inclusion

Conditional Inclusion

File Inclusion

10. What are storage classes?

A storage class defines the scope (visibility) and life time of variables and/or functions within a C Program.

11. What are the storage classes available in C?

There are following storage classes which can be used in a C Program

auto

register

static

extern

12. What is register storage in storage class?

Register is used to define local variables that should be stored in a register instead of RAM. This means that the variable has a maximum size equal to the register size (usually one word) and cant have the unary '&' operator applied to it (as it does not have a memory location).

```
{  
register int Miles;  
}
```

13. What is static storage class?

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Static is the default storage class for global variables. The two variables below (count and road) both have a static storage class.

```
static int
Count; int Road;
{
printf("%d\n", Road);
}
```

14. Define Auto storage class in C.

auto is the default storage class for all local variables.

```
{
int Count; auto
int Month;
}
```

The example above defines two variables with the same storage class. auto can only be used within functions, i.e. local variables.

15. Define pre-processor in C.

The C Preprocessor is not part of the compiler, but is a separate step in the compilation process. In simplistic terms, a C Preprocessor is just a text substitution tool. We'll refer to the C Preprocessor as the CPP.

Example:

#define Substitutes a preprocessor macro

#include Inserts a particular header from another file

GE6151 Computer Programming Question Bank

16. Define Macro in C.

A macro definition is independent of block structure, and is in effect from the #define directive that defines it until either a corresponding #undef directive or the end of the compilation unit is encountered.

Its format is: #define identifier replacement

Example:

```
#define TABLE_SIZE 100
int table1[TABLE_SIZE];
int table2[TABLE_SIZE];
```

17. What are conditional Inclusions in Preprocessor Directive?

Conditional inclusions (#ifdef, #ifndef, #if, #endif, #else and #elif)

These directives allow including or discarding part of the code of a program if a certain condition is met. #ifdef allows a section of a program to be compiled only if the macro that is specified as the parameter has been defined, no matter which its value is.

For example:

```
1 #ifdef TABLE_SIZE
2 int table[TABLE_SIZE];
3 #endif
```

18. What you meant by Source file Inclusion in Preprocessor directive?

Source file inclusion (#include)

This directive has also been used assiduously in other sections of this tutorial. When the preprocessor finds an #include directive it replaces it by the entire content of the specified file. There are two ways to specify a file to be included:

```
1 #include "file"
2 #include <file>
```

GE6151 Computer Programming Question Bank

19. What is Line control?

Line control (#line)

When we compile a program and some error happens during the compiling process, the compiler shows an error message with references to the name of the file where the error happened and a line number, so it is easier to find the code generating the error.

The #line directive allows us to control both things, the line numbers within the code files as well as the file name that we want that appears when an error takes place. Its format is:

```
#line number "filename"
```

Where number is the new line number that will be assigned to the next code line. The line numbers of successive lines will be increased one by one from this point on.

FUNDAMENTALS OF COMPUTING & COMPUTER PROGRAMMING

UNIT – I – 16 MARKS

1. Define computer. Explain the characteristics briefly? (MAY 2009\FEB 2009)

A computer is a programmable machine or device that performs pre-defined or programmed computations or controls operations that are expressible in numerical or logical terms at high speed and with great accuracy.

Characteristics of Computers

- Speed
 - Accuracy.
 - Automation.
 - Endurance.
 - Versatility.
 - Storage.
 - Cost Reduction.
-

2. With suitable examples, explain about Number systems. (JAN 2009)

A number system is a set of rules and symbols used to represent a number. There are several different number systems. Some examples of number systems are as follows:

- Binary (base 2)
- Octal (base 8)
- Decimal (base 10)
- Hexadecimal (base 16)

Decimal and Hexadecimal numbers can each be represented using binary values. This enables decimal, hexadecimal, and other number systems to be represented on a computer which is based around binary (0 or 1 / off or on). The base (or radix) of a number system is the number of units that is equivalent to a single unit in the next higher counting space. In the decimal number system, the symbols 0-9 are used in combination to represent a number of any sizes.

For example, the number 423 can be viewed as the following string of calculations: $(4 \times 100) + (2 \times 10) + (3 \times 1) = 400 + 20 + 3 = 423$

3. Describe evolution of computer? (JAN 2009 / MAY 2009)

- Abacus
 - Astrolabe
 - Pascaline
 - Stepped Reckoner
 - Difference Engine
 - Analytical Engine
 - Punch Cards
 - ENIAC (Electrical Numerical Integrator and Calculator)
 - Von Neumann Machine
-

4. Explain various generations of computers with features? (FEB 2009/FEB 2010)

Generation of Computers

Each phase of computer development is known as a separate generation of computers. The computer can be classified into four generations according to their type of electronic circuits such as vacuum tube, transistor, IC etc.

(a) The First Generation Computers (1949-55)

Main Features:

- 1) The computers of this generation used vacuum tubes.
- 2) These computers used machine language for giving instructions.
- 3) They used the concept of stored program.
- 4) These computers were 5000 times faster than the MARK-I.

5) The first generation computers were welcomed by Government and Universities.

Limitations:

1) These computers were very big in size. The ENIAC machine was 30 x 50 feet in size and 30 tons in weight. So, these machines required very large space for their workings.

2) Their power consumption was very high.

3) These computers had slow operating speed and small computing capacity.

4) These computers had a very small memory.

(b) The Second Generation Computers (1956-65) Main Features:

1) The computers of this generation replaced vacuum tubes with transistors.

2) Magnetic cores were invented for storage.

3) Different magnetic storage devices were developed in this generation.

4) Commercial applications were developed during this period. Eighty percent of these computers were used in business and industries.

(c) Third Generation Computers (1966-75) Main Features:

· The third generation computers replaced transistors with □ Integrated Circuits □. These Integrated Circuits are also known as chips.

· The size of main memory was increased and reached about 4 megabytes.

· Magnetic disk technology had been improved and drive having capacity upto 100

MBPS came into existence.

· The CPU becomes more powerful with the capacity of carrying out 1 million instructions per second.

· This generation computers were relatively inexpensive and faster.

· The application area also increased in this generation. The computers were used in other areas like education, small businesses survey, analysis along with their previous usage areas.

(d) The Fourth Generation Computers (1976-Present) Main Features:

i. The fourth generation computers replaced small scale integrated circuits and medium scale integrated circuits with the microprocessors chip.

ii. Semiconductor memories replaced magnetic core memories.

iii. The hard-disks are available of the sizes upto 200 GB. The RAID technology

(Redundant Array of Inexpensive Disks) gives storage upto thousands of GB. iv. Computer cost came down rapidly in this generation.

v. Application of computers is increased in various areas like visualization, parallel computing, multimedia etc.

(e) The Fifth Generation Computers

Mankind along with the advancement in science and technology is working hard to bring the Vth Generation of computer. These computers will have the capability of thinking on their own like an man with the help of Artificial Intelligence (AI). the 21st century will be better, faster, smaller and smarter computers.

5. Explain the fundamental units of a computer with a block diagram? (Or)

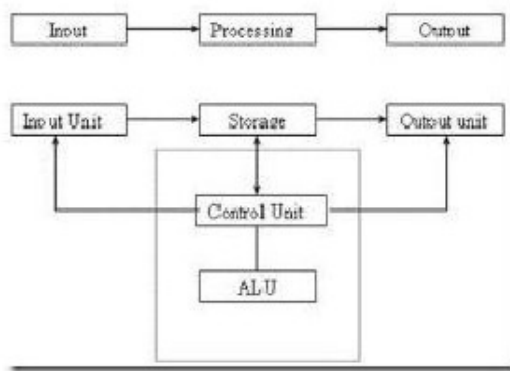
Explain the basic computer organization in detail? (JAN 2009\MAY 2009)

A computer can process data, pictures, sound and graphics. They can solve highly complicated problems quickly and accurately.

Input Unit:

Computers need to receive data and instruction in order to solve any problem. Therefore we need to input the data and instructions into the computers. The input unit consists of one or more input devices. Keyboard is the one of the most commonly used input device. Other commonly used input devices are the mouse, floppy disk drive, magnetic tape, etc. All the input devices perform the following functions.

- Accept the data and instructions from the outside world.
- Convert it to a form that the computer can understand.
- Supply the converted data to the computer system for further processing.



Storage Unit:

Block Diagram of Computer

The storage unit of the computer holds data and instructions that are entered through the input unit, before they are processed. It preserves the intermediate and final results before these are sent to the output devices. It also saves the data for the later use.

Types of Storage Devices:

1. Primary Storage:

1. Stores and provides very fast.
2. This memory is generally used to hold the program being currently executed in the computer, the data being received from the input unit, the intermediate and final results of the program.
3. The primary memory is temporary in nature. The data is lost, when the computer is switched off.
4. In order to store the data permanently, the data has to be transferred to the secondary memory. The cost of the primary storage is more compared to the secondary storage.

2. Secondary Storage:

1. It stores several programs, documents, data bases etc.
2. The programs that run on the computer are first transferred to the primary memory before it is actually run.
3. Whenever the results are saved, again they get stored in the secondary memory.
4. The secondary memory is slower and cheaper than the primary memory. Some of the commonly used secondary memory devices are Hard disk, CD, etc.,

Memory Size:

All digital computers use the binary system, i.e. 0s and 1s. Each character or a number is represented by an 8 bit code. The set of 8 bits is called a byte. A Character occupies 1 byte space. A numeric occupies 2 byte space. Byte is the space occupied in the memory. The size of the primary storage is specified in KB (Kilobytes) or MB (Megabyte). One KB is equal to 1024 bytes and one MB is equal to 1000KB. The size of the primary storage in a typical PC usually starts at 16MB. PCs having 32 MB, 48MB, 128 MB, 256MB memory are quite common.

Output Unit:

The output unit of a computer provides the information and results of a computation to

outside world. Printers, Visual Display Unit (VDU) are the commonly used output devices. Other commonly used output devices are floppy disk drive, hard disk drive, and magnetic tape drive. **Arithmetic Logical Unit:**

All calculations are performed in the Arithmetic Logic Unit (ALU) of the computer. It also does comparison and takes decision. The ALU can perform basic operations such as addition, subtraction, multiplication, division, etc and does logic operations viz, >, <, =, ,,etc. Whenever calculations are required, the control unit transfers the data from storage unit to ALU once the computations are done, the results are transferred to the storage unit by the control unit and then it is send to the output unit for displaying results.

Control Unit:

It controls all other units in the computer. The control unit instructs the input unit, where to store the data after receiving it from the user. It controls the flow of data and instructions from the storage unit to ALU. It also controls the flow of results from the ALU to the storage unit. The control unit is generally referred as the central nervous system of the computer that control and synchronizes its working.

Central Processing Unit:

The control unit and ALU of the computer are together known as the Central Processing Unit (CPU). The CPU is like brain performs the following functions:

- It performs all calculations.
- It takes all decisions.
- It controls all units of the computer.

A PC may have CPU-IC such as Intel 8088, 80286, 80386, 80486, Celeron, Pentium, Pentium Pro, Pentium II, Pentium III, Pentium IV, Dual Core, and AMD etc.

6. Explain the classification of computers? (MAY 2009\FEB 2009\FEB 2010)

Personal Computers:

CLASSIFICATION OF COMPUTERS

A personal computer (PC) is a self-contained computer capable of input, processing, output, and storage. A personal computer is designed to be a single-user computer and must have at least one input device, one output device, a processor, and memory. The three major groups of PCs are desktop computers, portable computers, and handheld computers. Desktop Computers: A desktop computer is a PC designed to allow the system unit, input devices, output devices, and other connected devices to fit on top of, beside, or under a user's desk or table. This type of computer may be used in the home, a home office, a library, or a corporate setting.

Portable Computers:

A portable computer is a PC small enough to be moved around easily. As the name suggests, a laptop computer fits comfortably on the lap. As laptop computers have decreased in size, this type of computer is now more commonly referred to as a notebook computer. Manufacturers recently began introducing a new type of computer called the tablet PC, which has a liquid crystal display (LCD) screen on which the user can write using a special-purpose pen, or stylus. Tablet PCs rely on digital ink technology that allows the user to write on the screen. Another type of portable computer, called a wearable computer, is worn somewhere on the body, thereby providing a user with access to mobile computing capabilities and information via the Internet.

Handheld Computers:

An even smaller type of personal computer that can fit into the hand is known as a handheld computer (also called simply handheld, pocket PC, or Palmtop). In recent years, a type of handheld computer called a personal digital assistant (PDA) has become widely used for performing calculations, keeping track of schedules, making appointments, and writing memos. Some handheld computers are Internet-enabled, meaning they can access the Internet without wire connections. For example, a smart phone is a cell phone that connects to the Internet to allow users to transmit and receive e-mail messages, send text messages and pictures, and browse through Web sites on the phone display screen.

Workstations:

A workstation is a high-performance single-user computer with advanced input, output, and storage components that can be networked with other workstations and larger computers. Workstations are typically used for complex applications that require considerable computing power and high-quality graphics resolution, such as computer-aided design (CAD), computer-assisted manufacturing (CAM), desktop publishing, and software development. **Midrange**

Servers:

Linked computers and terminals are typically connected to a larger and more powerful

computer called a network server, sometimes referred to as a host computer. Although the size and capacity of network servers vary considerably, most are midrange rather than large mainframe computers.

(i) Midrange server – formerly known as a minicomputer, a midrange server is a powerful computer capable of accommodating hundreds of client computers or terminals (users) at the same time.

(ii) Terminal – a device consisting of only a monitor and keyboard, with no processing capability of its own.

Mainframe Computers:

Larger, more powerful, and more expensive than midrange servers, a mainframe computer is capable of accommodating hundreds of network users performing different computing tasks. These computers are useful for dealing with large, ever-changing collections of data that can be accessed by many users simultaneously. Government agencies, banks, universities, and insurance companies use mainframes to handle millions of transactions each day.

- Supercomputers:

A supercomputer is the fastest, most powerful, and most expensive of all computers. Many are capable of performing trillions of calculations in a single second. Primary applications include weather forecasting, comparing DNA sequences, creating artificially intelligent robots, and performing financial analyses.

7. Describe briefly about Secondary storage devices? (MAY 2009)

Secondary storage devices, as indicated by the name, save data after it has been saved by the primary storage device, usually referred to as RAM (Random Access Memory). From the moment we start typing a letter in Microsoft Word, for example, and until we click on "Save," your entire work is stored in RAM. However, once you power off your machine, that work is completely erased, and the only copy remaining is on the secondary storage device where we saved it, such as internal or external hard disk drive, optical drives for CDs or DVDs, or USB flash drive.

Internal Hard Disk Drive

The internal hard disk drive is the main secondary storage device that stores all of your data

magnetically, including operating system files and folders, documents, music and video. The hard disk drive is a stack of disks mounted one on top of the other and placed in a sturdy case. They are spinning at high speeds to provide easy and fast access to stored data anywhere on a disk.

External Hard Disk Drive

External hard disk drives are used when the internal drive does not have any free space and

you need to store more data. In addition, it is recommended to always back up all of our data and an external hard drive can be very useful, as they can safely store large amounts of information. They can be connected by either USB connection to a computer and can even be connected with each other in case you need several additional hard drives at the same time.

Optical Drive

An optical drive uses lasers to store and read data on CDs and DVDs. It basically burns a series of bumps and dips on a disc, which are associated with ones and zeros. Then, this same drive can interpret the series of ones and zeros into data that can be displayed on your monitors. There are a few different types of both CD and DVD disks, but the main two types include R and RW, which stand for Recordable (but you can write information on it just once) and Rewritable (meaning you can record data on it over and over again).

USB Flash Drive

USB flash memory storage device is also portable and can be carried around on a key chain. This type of a secondary storage device has become incredibly popular due to the very small size of device compared to the amount of data it can store (in most cases, more than CDs or DVDs). Data can be easily read using the USB (Universal Serial Bus) interface that now comes standard with most of the computers.

8. Explain about memory in Computer System?

(or)

Write short notes on memory of a computer? (MAY

2009)

The Role of Memory

The term "memory" applies to any electronic component capable of temporarily storing data. There are two main categories of memories:

Internal memory that temporarily memorizes data while programs are running. Internal memory uses micro conductors, i.e. fast specialized electronic circuits. Internal memory corresponds to what we call random access memory (RAM).

Auxiliary memory (also called physical memory or external memory) that stores information over the long term, including after the computer is turned off. Auxiliary memory corresponds to magnetic storage devices such as the hard drive, optical storage devices such as CD-ROMs and DVD-ROMs, as well as read-only memories.

Technical Characteristics

(a) **Capacity**, representing the global volume of information (in bits) that the memory can store

(b) **Access time**, corresponding to the time interval between the read/write request and the availability of the data

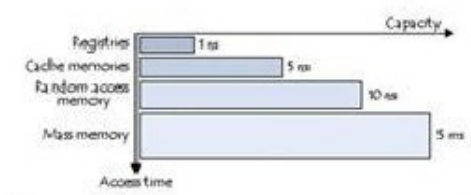
(c) **Cycle time**, representing the minimum time interval between two successive accesses

(d) **Throughput**, which defines the volume of information exchanged per unit of time, expressed in bits per second

(e) **Non-volatility**, which characterizes the ability of a memory to store data when it is not being supplied with electricity

The ideal memory has a large capacity with restricted access time and cycle time, a high throughput and is non-volatile.

However, fast memories are also the most expensive. This is why memories that use different technologies are used in a computer, interfaced with each other and organised hierarchically.



The fastest memories are located in small numbers close to the processor. Auxiliary memories, which are not as fast, are used to store information permanently.

Types of Memories

Random Access Memory

Random access memory, generally called RAM is the system's main memory, i.e. it is a space that allows you to temporarily store data when a program is running.

Unlike data storage on an auxiliary memory such as a hard drive, RAM is volatile, meaning that it only stores data as long as it is supplied with electricity. Thus, each time the computer is turned off, all the data in the memory are irremediably erased.

Read-Only Memory

Read-only memory, called ROM, is a type of memory that allows you to keep the information contained on it even when the memory is no longer receiving electricity. Basically, this type of memory only has read-only access. However, it is possible to save information in some types of ROM memory.

Flash Memory

Flash memory is a compromise between RAM-type memories and ROM memories. Flash memory possesses the non-volatility of ROM memories while providing both read and writes access. However, the access times of flash memories are longer than the access times of RAM.

9. Elaborate the various Input and Output Devices?

Input/Output devices are required for users to communicate with the computer. In simple terms, input devices bring information INTO the computer and output devices bring information OUT of a computer system. These input/output devices are also known as peripherals since they surround the CPU and memory of a computer system.

Some commonly used Input/Output devices are listed in table below.

Input Devices	Output Devices
Keyboard	Monitor
Mouse	LCD
Joystick	Printer
Scanner	Plotter
Light Pen	
Touch Screen	

(a) Keyboard

It is a text base input device that allows the user to input alphabets, numbers and other characters. It consists of a set of keys mounted on a board.

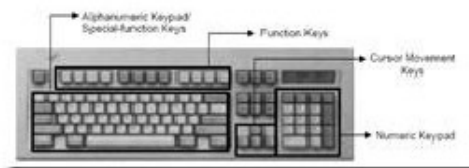


Figure 1: The Keyboard

Alphanumeric Keypad

It consists of keys for English alphabets, 0 to 9 numbers, and special characters like + - / * () etc.

Function Keys

There are twelve function keys labeled F1, F2, F3... F12. The functions assigned to these keys differ from one software package to another. These keys are also user programmable keys.

Special-function Keys

These keys have special functions assigned to them and can be used only for those specific purposes. Functions of some of the important keys are defined below.

Enter

It is similar to the „return□ key of the typewriter and is used to execute a command or program.

Spacebar

It is used to enter a space at the current cursor location.

Backspace

This key is used to move the cursor one position to the left and also delete the character in that position.

Delete

It is used to delete the character at the cursor position.

Insert

Insert key is used to toggle between insert and overwrite mode during data entry.

Shift

This key is used to type capital letters when pressed along with an alphabet key. Also used to type the special characters located on the upper-side of a key that has two characters defined on the same key.

Caps Lock

Cap Lock is used to toggle between the capital lock features. When „on□, it locks the alphanumeric keypad for capital letters input only.

Tab

Tab is used to move the cursor to the next tab position defined in the document. Also, it is used to insert indentation into a document.

Ctrl

Control key is used in conjunction with other keys to provide additional functionality on the keyboard.

Alt

Also like the control key, Alt key is always used in combination with other keys to perform specific tasks.

Esc

This key is usually used to negate a command. Also used to cancel or abort executing programs.

Numeric Keypad

Numeric keypad is located on the right side of the keyboard and consists of keys having numbers (0 to 9) and mathematical operators (+ – * /) defined on them. This keypad is provided to support quick entry for numeric data.

Cursor Movement Keys

These are arrow keys and are used to move the cursor in the direction indicated by the arrow (up, down, left, right).

(b) Mouse

The mouse is a small device used to point to a particular place on the screen and select in order to perform one or more actions. It can be used to select menu commands, size windows, start programs etc. The most conventional kind of mouse has two buttons on top: the left one being used most frequently.

Mouse Actions

Left Click : Used to select an item.

Double Click : Used to start a program or open a file.

Right Click : Usually used to display a set of commands.

Drag and Drop : It allows you to select and move an item from one location to another. To achieve this place the cursor over an item on the screen, click the left

mouse button and while holding the button down move the cursor to where you want to place the item, and then release it.



(c) Joystick

Figure 2: The Mouse

The joystick is a vertical stick which moves the graphic cursor in a direction the stick is moved. It typically has a button on top that is used to select the option pointed by the cursor. Joystick is used as an input device primarily used with video games, training simulators and controlling robots



Figure 3: The Joystick

(d)Scanner



Scanner is an input device used for direct data entry from the source document into the computer system. It converts the document image into digital form so that it can be fed into the computer. Capturing

information like this reduces the possibility of errors typically experienced during large data entry.

Figure 4: The Scanner

Hand-held scanners are commonly seen in big stores to scan codes and price information for each of the items. They are also termed the bar code readers.

(e) Bar codes

A bar code is a set of lines of different thicknesses that represent a number. Bar Code Readers are used to input data from bar codes. Most products in shops have bar codes on them. Bar code readers work by shining a beam of light on the lines that make up the bar code and detecting the amount of light that is reflected back



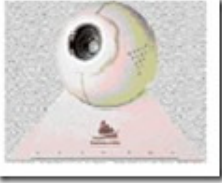
Figure 5: The Bar Code Reader

(f) Light Pen

It is a pen shaped device used to select objects on a display screen. It is quite like the mouse (in its functionality) but uses a light pen to move the pointer and select any object on the screen by pointing to the object. Users of Computer Aided Design (CAD) applications commonly use the light pens to directly draw on screen.

(g) Touch Screen

It allows the user to operate/make selections by simply touching the display screen. Common examples of touch screen include information kiosks, and bank ATMs. **(h)Digital camera**



A digital camera can store many more pictures than an ordinary camera. Pictures taken using a digital camera are stored inside its memory and can be transferred to a computer by connecting the camera to it. A digital camera takes pictures by converting the light passing through the lens at the front into a digital image.



Figure 6: The Digital camera

(i) The Speech Input Device

The “Microphones - Speech Recognition” is a speech Input device. To operate it we require using a microphone to talk to the computer. Also we need to add a sound card to the computer. The Sound card digitizes audio input into 0/1s .A speech recognition program can process the input and convert it into machine-recognized commands or input.

Output Devices

(a) Monitor

Monitor is an output device that resembles the television screen and uses a Cathode Ray Tube (CRT) to display information. The monitor is associated with a keyboard for manual input of characters and displays the information as it is keyed in. It also displays the program or application output. Like the television, monitors are also available in different sizes.



(b) Liquid Crystal Display (LCD)

LCD was introduced in the 1970s and is now applied to display terminals also. Its advantages like low energy consumption, smaller and lighter have paved its way for usage in portable computers (laptops).

(c) Printer

Figure 8: The LCD

Printers are used to produce paper (commonly known as hardcopy) output. Based on the technology used, they can be classified as Impact or Non-impact printers. Impact

printers use the typewriting printing mechanism wherein a hammer strikes the paper through a ribbon in order to produce output. Dot-matrix and Character printers fall under this category. Non-impact printers do not touch the paper while printing. They use chemical, heat or electrical signals to etch the symbols on paper. Inkjet, Deskjet, Laser, Thermal printers fall under this category of printers.



When we talk about printers we refer to two basic qualities associated with printers: resolution, and speed. Print resolution is measured in terms of number of dots per inch (dpi). Print speed is measured in terms of number of characters printed in a unit of time and is represented as characters-per-second (cps), lines-per-minute (lpm), or pages-per-minute (ppm).

Figure 9: The Printer