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CP-Assignment 1

1] State difference between Interpreter and Compiler.

→

Interpreter	Compiler
① It translates the program one statement at a time.	① Compiler scans the whole program in one go as a whole and translates it into machine code.
② It displays all the errors of each ~~time~~ line one by one.	② Displays all errors after compilation, all at same time.
③ Due to slow execution time, they are less preferred.	③ Main advantages of compiler is their fast execution time.
④ It does not convert source code into object code instead scanning it line by line.	④ It converts the source code into object code
⑤ Programming languages like Python, Ruby, JavaScript use interpretors	⑤ Programming languages like C, C++, C#, Java use compilers.

2] Write a program to find sum of n digits of a number given by the user.

→

```
#include <stdio.h>
int main()
{
```

```
int n, m, digit, sum = 0;
printf ("\n How many numbers?");
scanf ("%d", &n);
m = n;

if (n<=0)
{
   printf ("\n Invalid data!");
}
else
 {
     while (n>0)
       {
          digit = n%10;
          sum += digit;
          n = n/10;
       }
     printf ("\n Sum of the digits of %d is %d",
                  m, m, sum);
 }
 return 0;
}
```

Output: How many numbers? 1467
Sum of digits of 1467 is 18.

3] Explain recursion. State its advantages and disadvantages.

→ Recursion is a process in which the problem is specified in terms of itself. The function should be called itself to implement recursion. The function which calles itself is recursive function. A condition must be specified to stop recursion; otherwise it will lead to an infinite process. In case of recursion all partial soln are combined to obtain final soln.

Advantages:
(a) The main benefit of a recursive approach to algorithm design is that it allows programmer to advantage of repititive structure present in many problems.
(b) Complex case analysis and nested loops can be avoided.
(c) Recursion can lead to more readable and efficient algorithm discriptions.

Disadvantages:
(a) Slowing down execution time.
(b) It require a lot of memory space to hold results.
(c) Hard to analyze or understand code.
(d) It is not more efficient in terms of space & time complexity.
(e) Compiler can run out of memory if recursive calls are not properly checked.

4] Explain how the ~~program~~ problem is defined with help of suitable example.

→ A program is a set of step by step instructions. It directs the computer to do the tasks you want it do and produce the results you want. In computer programming, the term problem is task to be performed. In almost every problem solving methadology the first step is defining/identifying the problem. It is the most difficult and important of all steps.

The 4 stages of problem defining are:

(a) The problem statement is created by defining the problem.

(b) Next it is to be checked that the problem is being solved at right level.

(c) Once it is solved, the refinement of problem should be done for new concepts and implementations.

(d) Lastly, we need to scale problem for a larger dat set.

Example:

Lets consider a situation where shop is low on sales. Then the owner needs to define the problem properly before he can think of a soln. If the sale is low because of the location of the shop then owner needs to change place. If problem is product, then he needs to start selling quality products which are more in demand.