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Class : MCA (DS)

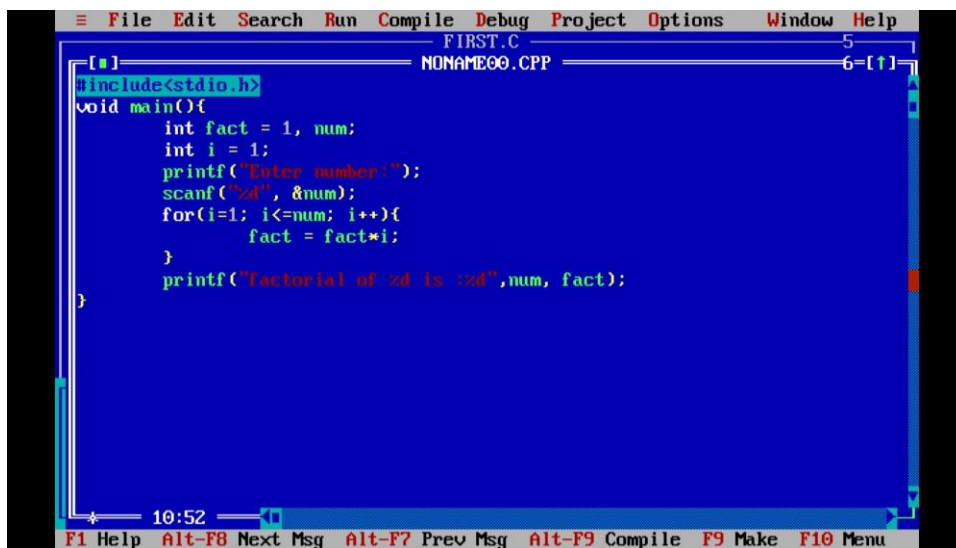
Roll number : 8

Assignment 3

Aim : Write an algorithm and find the efficiency of the same for following problems

A] Finding Factorial – Iterative Approach and Recursive Approach

1> Iterative Approach



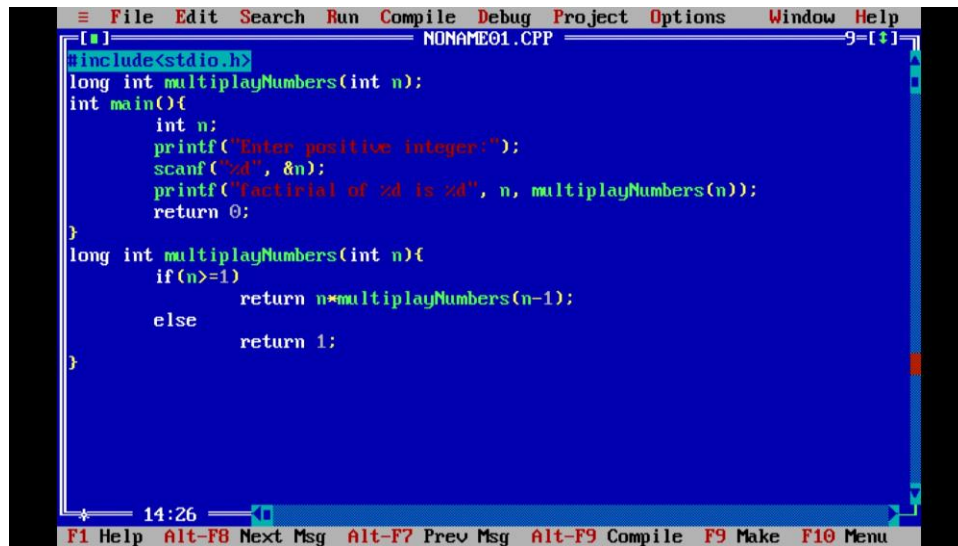
```
File Edit Search Run Compile Debug Project Options Window Help
FIRST.C 5
NONAME00.CPP 6-[+]-
#include<stdio.h>
void main(){
    int fact = 1, num;
    int i = 1;
    printf("Enter number:");
    scanf("%d", &num);
    for(i=1; i<=num; i++){
        fact = fact*i;
    }
    printf("Factorial of %d is %d",num, fact);
}
```

Output :

```
Enter number: 5
Factorial of 5 is 120

...Program finished with exit code 0
Press ENTER to exit console.
```

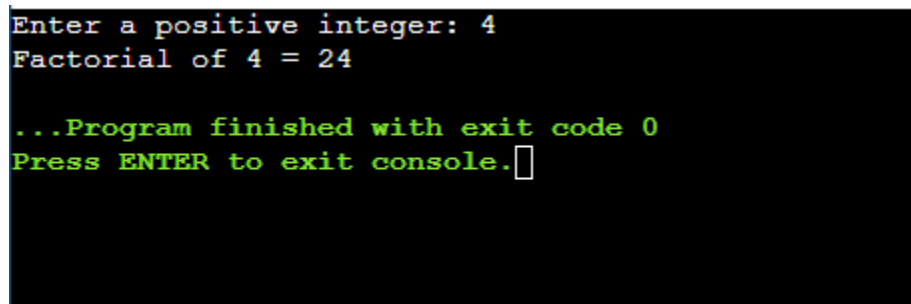
2> Recursive Approach



The screenshot shows a C++ IDE window titled 'NONAME01.CPP'. The code defines a recursive function 'multiplayNumbers' (sic) to calculate the factorial of a number 'n'. The 'main' function prompts the user to enter a positive integer, reads the input, and prints the factorial result. The IDE interface includes a menu bar with 'File', 'Edit', 'Search', 'Run', 'Compile', 'Debug', 'Project', 'Options', 'Window', and 'Help'. A status bar at the bottom shows the time '14:26' and various function key shortcuts like 'F1 Help', 'Alt-F8 Next Msg', 'Alt-F7 Prev Msg', 'Alt-F9 Compile', 'F9 Make', and 'F10 Menu'.

```
#include<stdio.h>
long int multiplayNumbers(int n);
int main(){
    int n;
    printf("Enter positive integer:");
    scanf("%d", &n);
    printf("Factorial of %d is %d", n, multiplayNumbers(n));
    return 0;
}
long int multiplayNumbers(int n){
    if(n>=1)
        return n*multiplayNumbers(n-1);
    else
        return 1;
}
```

Output :



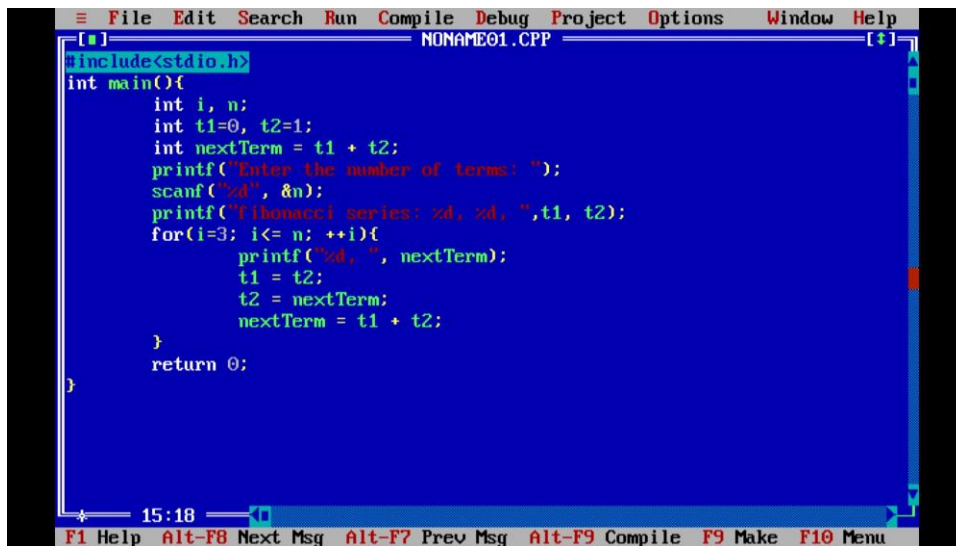
The screenshot shows the output of the program in a console window. It displays the prompt 'Enter a positive integer:' followed by the user input '4'. The program then outputs 'Factorial of 4 = 24'. Below this, it shows the message '...Program finished with exit code 0' and 'Press ENTER to exit console.' with a cursor.

```
Enter a positive integer: 4
Factorial of 4 = 24

...Program finished with exit code 0
Press ENTER to exit console.
```

B] Printing Fibonacci Series – Iterative Approach and recursive approach

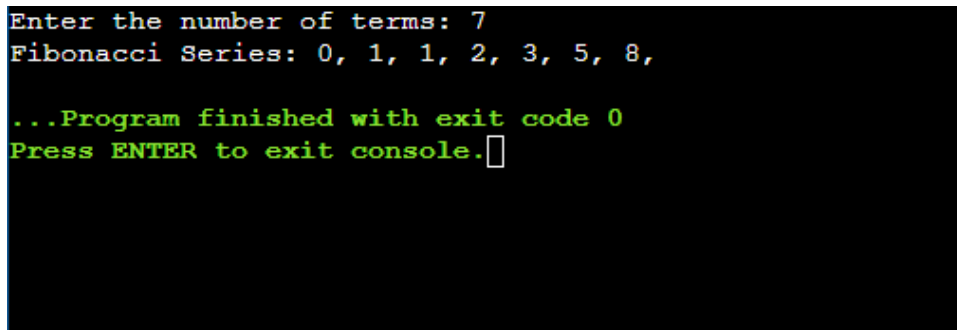
1> Iterative Approach



```
File Edit Search Run Compile Debug Project Options Window Help
NONAME01.CPP
#include<stdio.h>
int main(){
    int i, n;
    int t1=0, t2=1;
    int nextTerm = t1 + t2;
    printf("Enter the number of terms: ");
    scanf("%d", &n);
    printf("Fibonacci series: %d, %d, ", t1, t2);
    for(i=3; i<= n; ++i){
        printf("%d, ", nextTerm);
        t1 = t2;
        t2 = nextTerm;
        nextTerm = t1 + t2;
    }
    return 0;
}
```

15:18
F1 Help Alt-F8 Next Msg Alt-F7 Prev Msg Alt-F9 Compile F9 Make F10 Menu

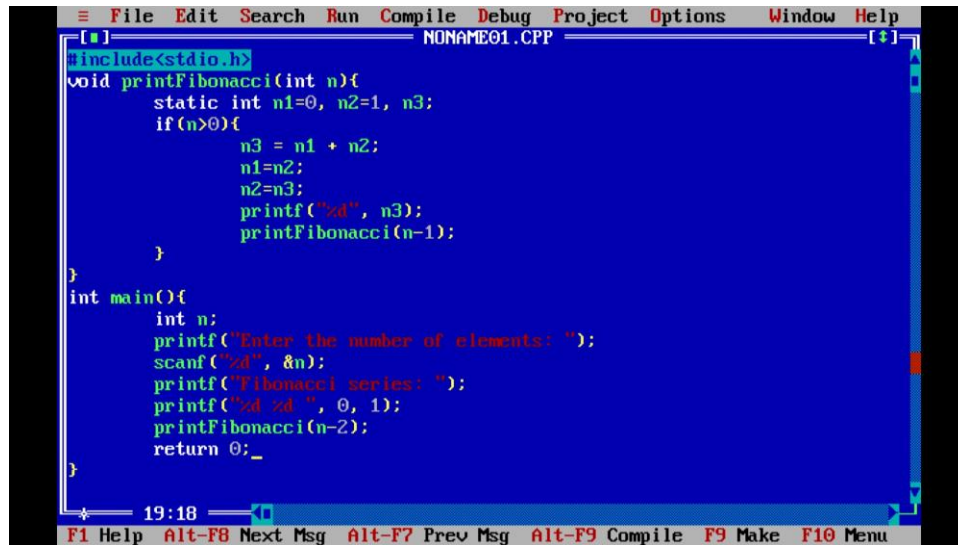
Output :



```
Enter the number of terms: 7
Fibonacci Series: 0, 1, 1, 2, 3, 5, 8,

...Program finished with exit code 0
Press ENTER to exit console.
```

2> Recursive Approach

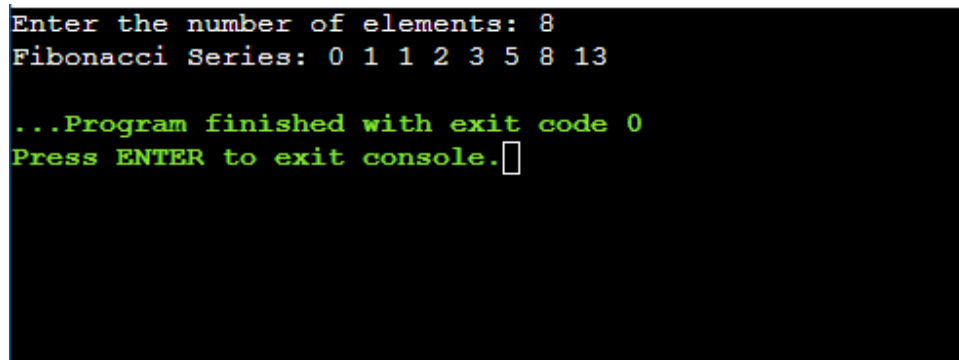


The screenshot shows a C++ IDE window titled 'NONAME01.CPP'. The code implements a recursive function to calculate the Fibonacci sequence. The function 'printFibonacci' takes an integer 'n' and prints the sequence of numbers from 0 up to 'n'. It uses static variables 'n1', 'n2', and 'n3' to store the previous two numbers in the sequence. The 'main' function prompts the user to enter the number of elements, reads the input, and calls 'printFibonacci' with the input value minus 2 (since the sequence starts at 0 and 1).

```
#include<stdio.h>
void printFibonacci(int n){
    static int n1=0, n2=1, n3;
    if(n>0){
        n3 = n1 + n2;
        n1=n2;
        n2=n3;
        printf("%d", n3);
        printFibonacci(n-1);
    }
}
int main(){
    int n;
    printf("Enter the number of elements: ");
    scanf("%d", &n);
    printf("Fibonacci series: ");
    printf("%d %d ", 0, 1);
    printFibonacci(n-2);
    return 0;_
}
```

The status bar at the bottom shows the time '19:18' and various function key shortcuts: F1 Help, Alt-F8 Next Msg, Alt-F7 Prev Msg, Alt-F9 Compile, F9 Make, and F10 Menu.

Output :



The screenshot shows the output of the program in a console window. It displays the prompt 'Enter the number of elements: 8', followed by the output 'Fibonacci Series: 0 1 1 2 3 5 8 13'. Below this, it shows the message '...Program finished with exit code 0' and 'Press ENTER to exit console.' with a cursor.

```
Enter the number of elements: 8
Fibonacci Series: 0 1 1 2 3 5 8 13

...Program finished with exit code 0
Press ENTER to exit console.
```

