

Kalyani Government Engineering College

Department of Computer Application
Python Programming Lab – MCAN191
Year: 2023-2024
Semester: 1st Semester
Assignment 8
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8.1 Write a recursive function that accepts an integer argument and returns the factorial.

```
Code :
def fact(n):
    if n==0:
        return 1
    return n*fact(n-1)

x=int(input("Enter the integer : \n"))
print("Factorial of",x,"is",fact(x))
```

Output:
Enter the integer :
7
Factorial of 7 is 5040

8.2 Write a recursive function that accepts two numbers as its argument and returns its power.

```
Code:
def power_of(x,y):
    if y==0:
        return 1
    y-=1
    return x*power_of(x,y)

x,y=[int(i) for i in input("Enter the number and the power value\n").split()]
print(x,"^",y,"=",power_of(x,y))
```

Output:
Enter the number and the power value
4 3
4 ^ 3 = 64

8.3 Write a recursive function that accepts a number as its argument and returns the sum of digits.

```
Code :
def sum_dig(n):
    if n==0:
        return n
    return (n%10)+sum_dig(n//10)

n=int(input("Enter the number\n"))
print("Sum of the digit of",n,"is",sum_dig(n))
```

```
Output:
Enter the number
90932
Sum of the digit of 90932 is 23
```

8.4 Write a program that reads two integers from keyboard and calculate the greatest common divisor (gcd) using recursive function.

```
Code:
def gcd_pro(a,b):
    if a==0:
        return b
    return gcd_pro(b%a,a)

a,b=[int(i) for i in input("Enter two integer\n").split()]

print("GCD of",a,"and",b,"is",gcd_pro(a,b))
```

```
Output:
Enter two integer
32 24
GCD of 32 and 24 is 8
```

8.5 Write a recursive function that accepts an integer argument in n. This function returns the nth Fibonacci number. Call the function to print fibonacci sequences.

```
Code:
```

```
def fib(n):
    if n==0:
        return 0
    if n==1:
        return 1
    return fib(n-1)+fib(n-2)

x=int(input("Enter the number\n"))
print(x,"th fibonacci number is(counting from 0 ,1 ,...)",fib(x-1))
```

Output:
Enter the number
10
10 th fibonacci number is(counting from 0 ,1 ,...) 34

8.6 Write a recursive function that accepts a decimal integer and display its binary equivalent.

Code:

```
def d2b(n):
    if n>=1:
        d2b(n//2)#5 2 1 0
    if n!=0:
        print(n%2,end=" ")
    return ""

x=int(input("Enter the decimal number\n"))
print("is Binary equivalent of",x,d2b(x))
```

Output:
Enter the decimal number
31
1 1 1 1 1 is Binary equivalent of 31

8.7 Write a recursive function that calculate sum of first n natural numbers.

```

Code:
def sum_of_nat(n):
    if n==0:
        return 0
    return n+sum_of_nat(n-1)

x=int(input("Enter the range\n"))

print("Sum of the",x,"th natural numbers is",sum_of_nat(x))

```

```

Output:
Enter the range
10
Sum of the 10 th natural numbers is 55

```

8.8 ment X to be searched from the List Arr having R elements, where L represents lower bound and R represents the upper bound.

```

Code:
def BinarySearch(Arr, L, R, X):

    if L>R:
        print("Not found")
        return
    mid=(L+R)//2

    if X==Arr[mid]:
        print("Found it! at index",mid)
        return True

    if X>Arr[mid]:
        BinarySearch(Arr,mid+1,R,X)
    else:
        BinarySearch(Arr,L,mid-1,X)
l=[int(i) for i in input("Enter elements to the list\n").split()]
l.sort()
print("The sorted list",l)
x=int(input("Enter the element to be searched\n"))
BinarySearch(l,0,len(l)-1,x)

```

```
Output:
Enter elements to the list
9 19 -26 0 -1 53 67
The sorted list [-26, -1, 0, 9, 19, 53, 67]
Enter the element to be searched
19
Found it! at index 4
```