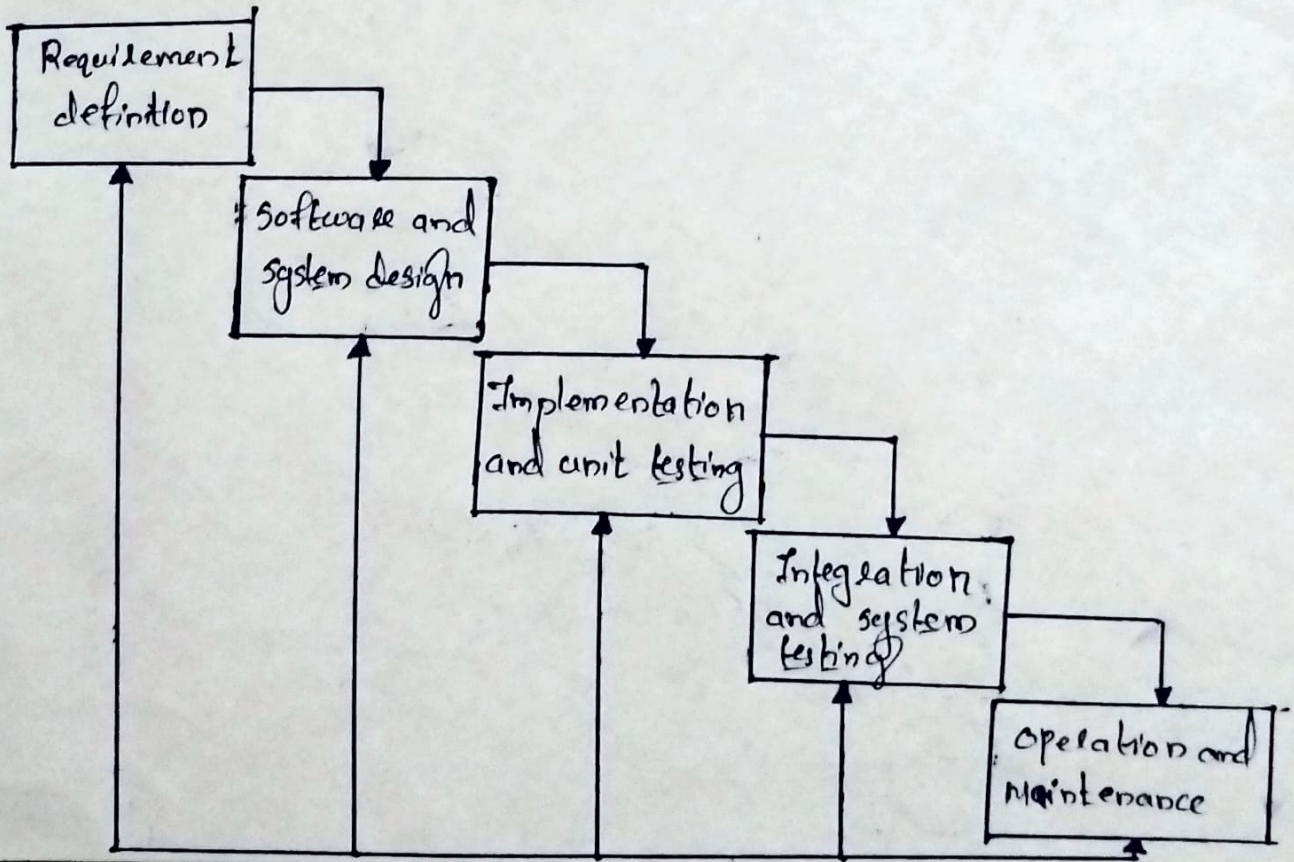
Q.1. which are the different stages in a software development process? Explain the waterfall model in detail.

Ans): The software development process typically involves stages like:

- Requirements gather: understanding and documenting project needs
- planning: outlining tasks, timlines and resources
- Design: Creating the system architecture and user interface
- Implementation: writing and testing the actual code.
- Testing: Assessing software to identify and fix issues.
- Deployment: Releasing the software for users.

⇒ Waterfall Model:



⇒ Requirement definition: This system service, constrains and goals are established by consultation with system users.

⇒ System and software design: Design process allocates the requirements to either hardware or software system.

⇒ Implementation and unit testing: During this stage the software design is realized as a set of program or program units.

⇒ Integration and system testing: The individual program or program units are integrated and tested as a complete system to ensure that software requirement have been met.

⇒ Operational maintenance: The system is installed and put into the practical use maintenance involve correcting errors that were not discovered in the easley stages of cycle.

2.Q. Explain higher order function and lambda functions in python

Ans): Higher order function is a function that either takes one or more functions as arguments or return a function as its result.

eg:
```
def apply-operation (operation, x, y):
        return operation (x, y)
def add (x, y):
        return x+y
```

```
def multiply (x,y):
    return x*y

result_add = apply_operation (add, 3, 4)
print (result_add)

result_multiply = apply_operation (multiply, 3, 4)
print (result_multiply)
```

- Lambda functions: known as anonymous functions are small, anonymous functions defined using 'lambda' keyword.

eg: `add = lambda x,y: x+y`

```
result = add (3,4)
print (result)
```

- lambda functions used in conjunction with higher order functions create more concise and readable code

eg:
```
numbers = [1,2,3,4,5]
squared = map (lambda x: x**2, numbers)
print (list (squared))
```

Q.3. write a python program to input a point and find the quadrant.

Ans): Program:

```
Print ("The co-ordinates of a point")
x = float (input ('x ='))
```

```
y=float(input('y = '))
if x>0 and y>0:
    print("1st quadrant")
elif x<0 and y>0:
    print("2nd quadrant")
elif x<0 and y>0:
    print("3rd quadrant")
elif x>0 and y<0:
    print("4th quadrant")
elif x==0 and y==0:
    print("The point is at the origin")
elif x==0:
    print("The point is on x-axis")
elif y==0:
    print("The point is on y-axis")
```

⇒ Output:

The co-ordinates of a point

x = 3

y = -2

4th quadrant

Q. 4. Write a python program to find the value for sin(x) upto to n terms using the series $\sin(x) = 1 - x^3/3! + \frac{x^5}{5!} \ldots$ use a recursive function to find the factorial.

Program:

```
def fact(s):
    if s==0:
        return 1
    else:
        return s* fact(s-1)
x = int(input("Enter the value of x"))
li= int(input("Enter limit:"))
sin=x
mult=-1
for i in range(3,li+1,2):
        sin = sin + pow(x,i) /fact(i) * mult
        mult = mult* -1
print("Value:", sin)
```

Output:

```
Enter Value of x: 5
Enter limit : 7
Value : -0.9107142857142857
```

Q.5. Write a python program that uses a dictionary to convert hexadecimal numbers into binary.

Ans): Program:

```
hex_num = input("enter hexadecimal number :")
```

```
hex_dic = { '0':'0000' ,'1': '0001' ,'2': '0010', '3': '0011',
            '4':'0100', '5':'0101', '6': '0110', '7': '0111',
            '8':'1000', '9':'1001', 'A': '1010', 'B':'1011',
            'C':'1100', 'D':'1101', 'E':'1110', 'F':'1111' }

binary = ' '
for digit in hex_num:
    binary += hex_dic [digit]
print ("Binary Value :", binary )
```

→ output:

```
Enter hexadecimal number: 1F
Binary Value : 0001 1111
```