```
def power(x, n):
    if n == 0:
        return 1
    else:
        if n % 2 == 0:
            y = power(x, n//2)
            return y*y
        else:
            y = power(x, (n-1)//2)
            return x*y*y

while True:
    x = int(input("Enter the base number (-1 to exit): "))
    if x == -1:
        break
    n = int(input("Enter the power: "))
    result = power(x, n)
    print(f"{x} to the power of {n} is {result}")
```

Data Structures and Algorithms IT2070

Year two Semester two 2020

Online Examination

Sri Lanka Institute of Information Technology

Time: 30 minutes

Paper Number 4 (20 marks)

The power function can be defined as $pow(x,n) = x^n$. This can be evaluated using the multiplication as $x^n = \{x \times x\}^{n-1}$ where x is any real number and n is a non-negative integer.

[Hint: $pow(x,n-1) = x^{n-1}$]

A recursive algorithm for the power calculation is given below:

Power $x^N = x * x^{N-1}$ for $N>0$

$x^0 = 1$

```
1 function Power returnsa Num(base, exp)
2 // Computes the value of Base^Exp
3 // Pre: exp is a non-negative integer
4  if (exp = 0) then
5    returns 1
6  else
7    returns base * Power(base, exp-1)
8  endif
9 endfunction
```

a) Write a program in Python to read an integers from the keyboard for *x* and *n*.
b) Develop a function in python named as power and implement the above recursive algorithm.
c) Pass the input numbers as parameter to the function developed and get the power of number as output.
d) Use the loop to run the program and display the correct output until user inputs -1.

Upload your answer using given template to the course web link "Paper Number 4"

Grading Sheet:

1) Program is compiling. **2 marks**
2) Program is running successfully. **2 marks**
3) Program takes the input number as integer. **2 marks**
4) Correct implementation power function. 6 **marks**
5) Display the output correctly **2 marks**
6) Use of loop correctly **4 marks**
7) Include comments and properly indented. **2 marks**
8) Plagiarism testing tool results:……..