



Bharatiya Vidya Bhavan's
Sardar Patel Institute of Technology
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

SE – COMP (SE-A)

Sub- DAA Lab

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UID No.	2021300014
Subject	Design and Analysis of Algorithms
Class	Comps A
Experiment No.	1
AIM	To implement the various functions e.g., linear, non-linear, quadratic, exponential etc.

THEORY:

A function is a relation between a set of inputs and a set of permissible outputs with the property that each input is related to exactly one output. Let A & B be any two non-empty sets; mapping from A to B will be a function only when every element in set A has one end, only one image in set B.

PROGRAM:

```
#include <stdio.h>
#include <stdlib.h>
#include <math.h>

long factorial(int num){
    if(num == 0){
        return 1;
    }
    else{
        return (num*factorial(num-1));
    }
}

int main(){
```



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```
printf("Function 1 : n cube\n");
for(double i=0; i<=100; i++){
    printf("%.0lf\n", pow(i,3));
}

printf("Function 2 : log2 n squared\n");
for(double i=0; i<=100; i++){
    printf("%.3lf\n", pow(log2(i),2));
}

printf("Function 3 : e power n\n");
for(double i=0; i<=100; i++){
    printf("%.3lf\n", exp(i));
}

printf("Function 4 : root log2 n\n");
for(double i=0; i<=100; i++){
    printf("%.3lf\n", pow(log2(i),0.5));
}

printf("Function 5 : n log2 n\n");
for(double i=0; i<=100; i++){
    printf("%.3lf\n", i*log2(i));
}

printf("Function 6 : log log n\n");
for(double i=0; i<=100; i++){
    printf("%.3lf\n", log(log(i)));
}

printf("Function 7 : log2 log2 n\n");
for(double i=0; i<=100; i++){
```



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```
    printf("%.3lf\n", log2(log2(i)));
}

printf("Function 8 : n*(2 power n)\n");
for(double i=0; i<=100; i++){
    printf("%.3lf\n", i*pow(2,i));
}

printf("Function 9 : 2 power 2 power n\n");
for(double i=0; i<=100; i++){
    printf("%.3lf\n", pow(2, pow(2,i)));
}

printf("Function 10 : 2 power log2 n\n");
for(double i=0; i<=100; i++){
    printf("%.3lf\n", pow(2,log2(i)));
}

printf("Function 11 : n!\n");
for(double i=1; i<=20; i++){
    printf("%ld\n", factorial(i));
}

return 0;
}
```

ANALYTICAL RESULT:

Function 1: Exists for all values of n.

Function 2: Exists for all values of n except n=0, as n=0 is not defined.

Function 3: Exists for all values of n and grows exponentially.

Function 4: Exists for all values of n except n=0, as at n=0 is not defined.



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Function 5: Exists for all values of n and has a roughly liner plot

Function 6: Exists for all values of n except $n=0,1$ as at $n=0,1$ function is not defined.

Function 7: Exists for all values of n except $n=0,1$ as at $n=0,1$ function is not defined.

Function 8: Exists for all values of n and grows rapidly.

Function 9: Exists for all values of n and grows rapidly, not enough to calculate in excel sheets.

Function 10: Exists for all values of n and has a liner plot.

Function 11: Exists for all values of n and grows rapidly, not enough to calculate in excel sheets.