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Experiment No.	1A

AIM:	To implement the various functions (e.g. linear, non-linear, quadratic, exponential etc)
Program 1	
PROBLEM STATEMENT :	**Problem Definition & Assumptions –** For this experiment, you have to implement at least 15 functions from the given list. The input (i.e. n) to all the above functions varies from 0 to 100 with increment of 1. Then add the function n! and exponential functions in the list and execute the same for n from 0 to 15. **Input –** 1) Each student randomly chose any 15 functions from the aforementioned list. **Output –** 1) Print the values of each function value for all n starting 0 to 100 in tabular format for both aforementioned cases 2) One Page Report along with a 2D plot of all functions such that x-axis represents the values of n and y-axis represent the function value for different n values using LibreOffice Calc/MS Excel.

PROGRAM:	#include <stdio.h>
	#include <math.h>
	#include <stdlib.h>
	
	long long factorial(int n);
	long long cube(int n);
	double natural_log(int n);
	double log_base2(int n);
	double exponential(int n);
	long long power_of_two(int n);

```
double ln_of_ln(int n);
double lg_of_lg(int n);
double n_log2(int n);
long long n_power_of_two(int n);

void print_to_terminal(const char *function_names[], double values[][101],
int num_functions, int size);

void write_to_csv(const char *filename, const char *function_names[],
double values[][101], int num_functions, int size);

int main() {
  const int max_n = 100;
  const int limited_n = 20;
  double values[11][max_n + 1];
  const char *function_names[] = {
     "Factorial",
     "Cube",
     "Natural Log (ln)",
     "Log Base 2 (lg)",
     "Exponential (e^n)",
     "Power of 2 (2^n)",
     "ln(ln(n))",
     "lg(lg(n))",
     "n*lg(n)",
     "n*2^n"
  };

  // Factorial
  for (int i = 0; i <= max_n; i++) {
     values[0][i] = (i <= limited_n) ? factorial(i) : NAN;
  }

  // Cube
  for (int i = 0; i <= max_n; i++) {
     values[1][i] = cube(i);
  }
```

```
// Natural Logarithm (ln)
for (int i = 0; i <= max_n; i++) {
    values[2][i] = natural_log(i);
}

// Log base 2 (lg)
for (int i = 0; i <= max_n; i++) {
    values[3][i] = log_base2(i);
}

// Exponential (e^n)
for (int i = 0; i <= max_n; i++) {
    values[4][i] = (i <= limited_n) ? exponential(i) : NAN;
}

// Power of 2 (2^n)
for (int i = 0; i <= max_n; i++) {
    values[5][i] = (i <= limited_n) ? power_of_two(i) : NAN;
}

// ln(ln(n))
for (int i = 0; i <= max_n; i++) {
    values[6][i] = ln_of_ln(i);
}

// lg(lg(n))
for (int i = 0; i <= max_n; i++) {
    values[7][i] = lg_of_lg(i);
}

// n * lg(n)
for (int i = 0; i <= max_n; i++) {
    values[8][i] = n_log2(i);
}

// n * 2^n
for (int i = 0; i <= max_n; i++) {
    values[9][i] = (i <= limited_n) ? n_power_of_two(i) : NAN;
```

```
  }

  printf("\n--- First 5 Functions ---\n");
  print_to_terminal(function_names, values, 5, max_n + 1);

  printf("\n--- Next 5 Functions ---\n");
  print_to_terminal(function_names + 5, values + 5, 5, max_n + 1);

  write_to_csv("output.csv", function_names, values, 10, max_n + 1);

  printf("\nData has been written to output.csv\n");
  return 0;
}

long long factorial(int n) {
  if (n == 0 || n == 1) return 1;
  long long fact = 1;
  for (int i = 2; i <= n; i++) {
      fact *= i;
  }
  return fact;
}

long long cube(int n) {
  return (long long)n * n * n;
}

double natural_log(int n) {
  return (n > 0) ? log(n) : NAN;
}

double log_base2(int n) {
  return (n > 0) ? log2(n) : NAN;
}

double exponential(int n) {
  return exp(n);
}
```

```
long long power_of_two(int n) {
  return (long long)pow(2, n);
}

double ln_of_ln(int n) {
  return (n > 1) ? log(log(n)) : NAN;
}

double lg_of_lg(int n) {
  return (n > 1) ? log2(log2(n)) : NAN;
}

double n_log2(int n) {
  return (n > 0) ? n * log2(n) : 0;
}

long long n_power_of_two(int n) {
  return (long long)n * (long long)pow(2, n);
}

void print_to_terminal(const char *function_names[], double values[][101],
int num_functions, int size) {
  // Print headers
  printf("%-10s", "n");
  for (int i = 0; i < num_functions; i++) {
     printf("%-20s", function_names[i]);
  }
  printf("\n");

  // Print values
  for (int i = 0; i < size; i++) {
     printf("%-10d", i);
     for (int j = 0; j < num_functions; j++) {
        if (isnan(values[j][i])) {
           printf("%-20s", "N/A");
        } else {
           printf("%-20.2e", values[j][i]);
```

```
            }
        }
        printf("\n");
    }
}

void write_to_csv(const char *filename, const char *function_names[],
double values[][101], int num_functions, int size) {
    FILE *file = fopen(filename, "w");
    if (file == NULL) {
        printf("Error opening file: %s\n", filename);
        return;
    }

    // Write header
    fprintf(file, "n");
    for (int i = 0; i < num_functions; i++) {
        fprintf(file, ",%s", function_names[i]);
    }
    fprintf(file, "\n");

    // Write values
    for (int i = 0; i < size; i++) {
        fprintf(file, "%d", i);
        for (int j = 0; j < num_functions; j++) {
            if (isnan(values[j][i])) {
                fprintf(file, ",N/A");
            } else {
                fprintf(file, ",%.2e", values[j][i]);
            }
        }
        fprintf(file, "\n");
    }

    fclose(file);
}
```

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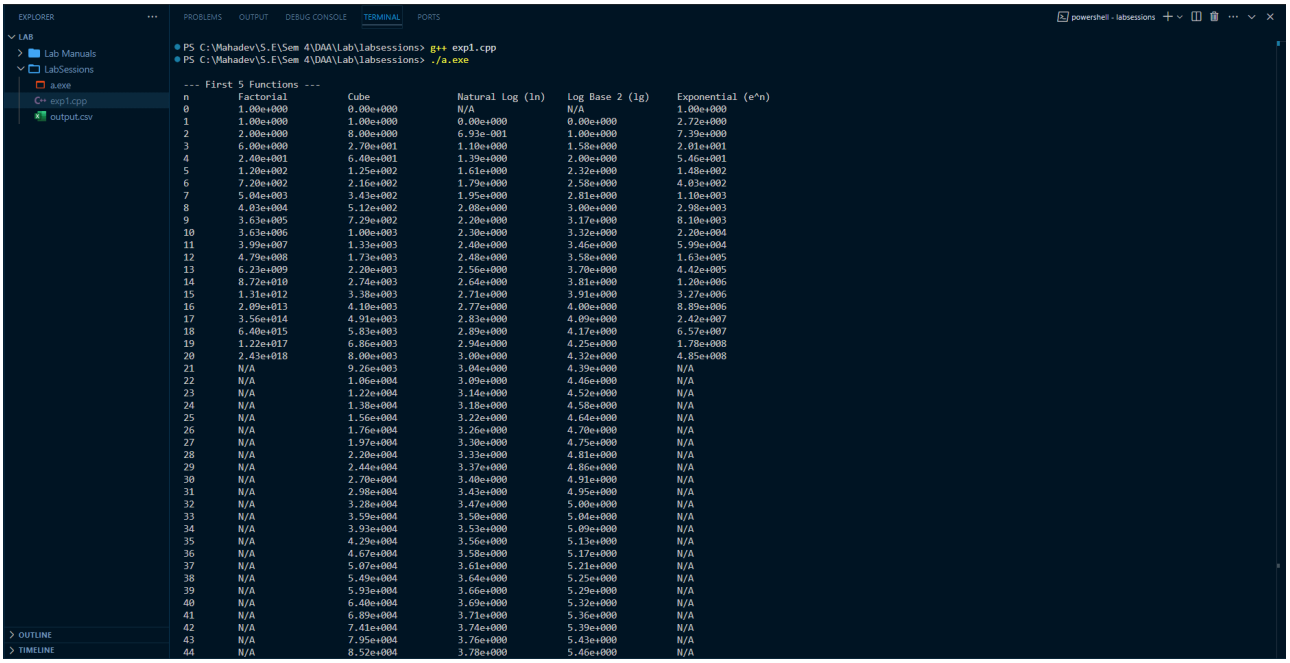
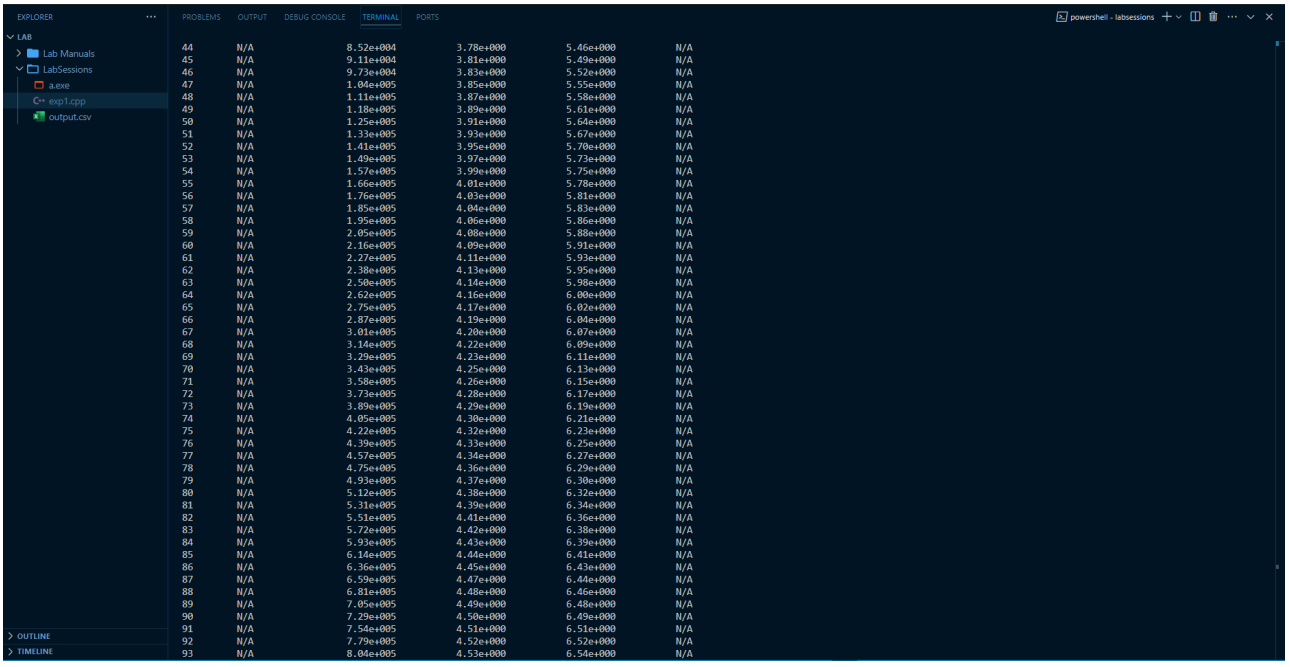
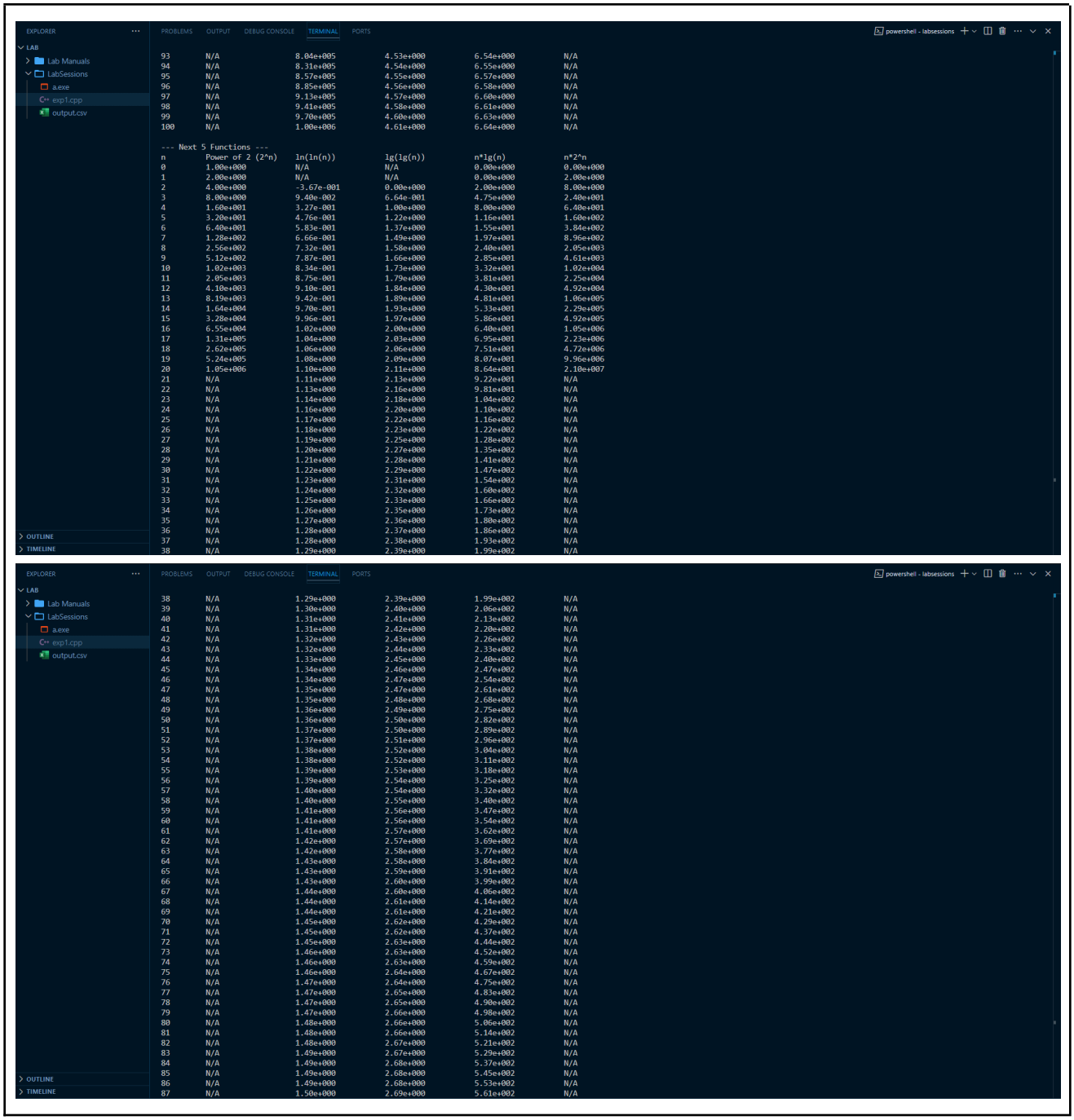
RESULT:





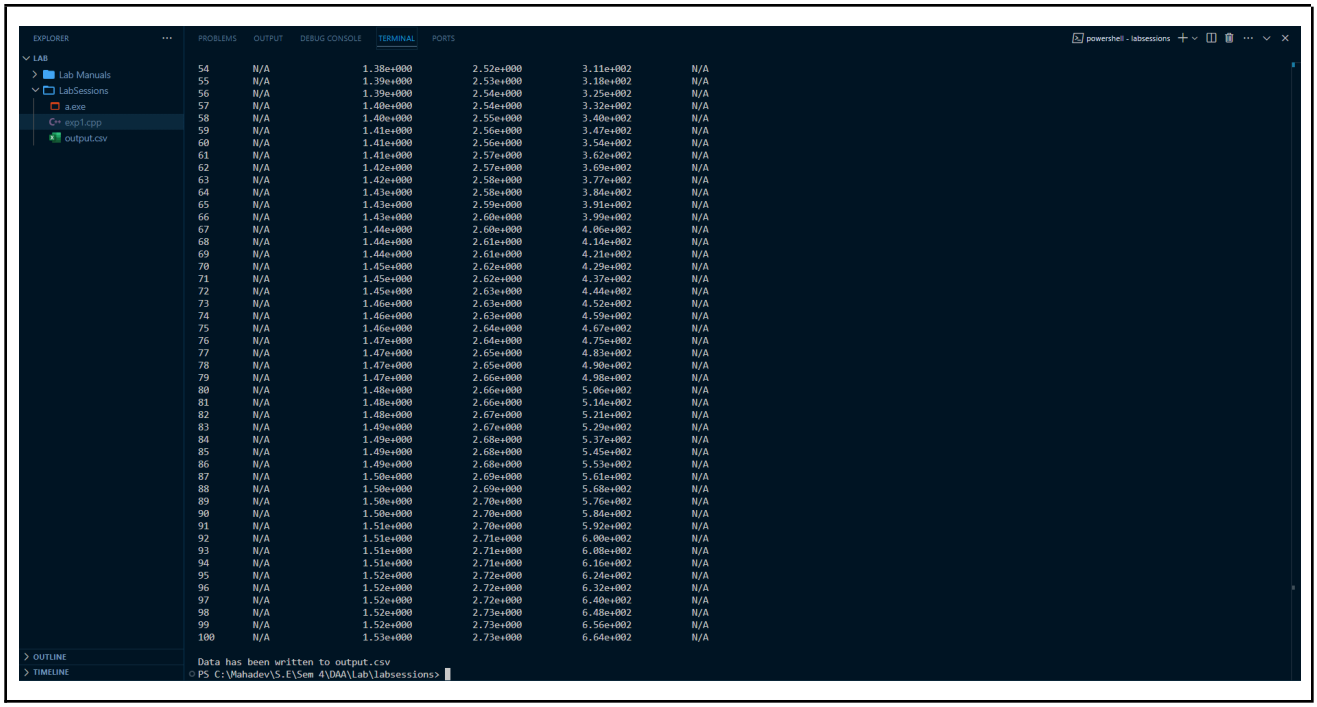



```
93      N/A             8.04e+005       4.53e+000       6.54e+000       N/A
94      N/A             8.31e+005       4.54e+000       6.55e+000       N/A
95      N/A             8.57e+005       4.55e+000       6.57e+000       N/A
96      N/A             8.85e+005       4.56e+000       6.58e+000       N/A
97      N/A             9.13e+005       4.57e+000       6.60e+000       N/A
98      N/A             9.41e+005       4.58e+000       6.61e+000       N/A
99      N/A             9.70e+005       4.60e+000       6.63e+000       N/A
100     N/A             1.00e+006       4.61e+000       6.64e+000       N/A

--- Next 5 Functions ---
n       Power of 2 (2^n)        ln(ln(n))       lg(lg(n))       n*lg(n)         n*2^n
0       1.00e+000       N/A             N/A             0.00e+000       0.00e+000
1       2.00e+000       N/A             N/A             0.00e+000       2.00e+000
2       4.00e+000       -3.67e-001      0.00e+000       2.00e+000       8.00e+000
3       8.00e+000       9.40e-002       6.64e-001       4.75e+000       2.40e+001
4       1.60e+001       3.27e-001       1.00e+000       8.00e+000       6.40e+001
5       3.20e+001       4.76e-001       1.22e+000       1.16e+001       1.60e+002
6       6.40e+001       5.83e-001       1.37e+000       1.55e+001       3.84e+002
7       1.28e+002       6.66e-001       1.49e+000       1.97e+001       8.96e+002
8       2.56e+002       7.32e-001       1.58e+000       2.40e+001       2.05e+003
9       5.12e+002       7.87e-001       1.66e+000       2.85e+001       4.61e+003
10      1.02e+003       8.34e-001       1.73e+000       3.32e+001       1.02e+004
11      2.05e+003       8.75e-001       1.79e+000       3.81e+001       2.25e+004
12      4.10e+003       9.10e-001       1.84e+000       4.30e+001       4.92e+004
13      8.19e+003       9.42e-001       1.89e+000       4.81e+001       1.06e+005
14      1.64e+004       9.70e-001       1.93e+000       5.33e+001       2.29e+005
15      3.28e+004       9.96e-001       1.97e+000       5.86e+001       4.92e+005
16      6.55e+004       1.02e+000       2.00e+000       6.40e+001       1.05e+006
17      1.31e+005       1.04e+000       2.03e+000       6.95e+001       2.23e+006
18      2.62e+005       1.06e+000       2.06e+000       7.51e+001       4.72e+006
19      5.24e+005       1.08e+000       2.09e+000       8.07e+001       9.96e+006
20      1.05e+006       1.10e+000       2.11e+000       8.64e+001       2.10e+007
21      N/A             1.11e+000       2.13e+000       9.22e+001       N/A
22      N/A             1.13e+000       2.16e+000       9.81e+001       N/A
23      N/A             1.14e+000       2.18e+000       1.04e+002       N/A
24      N/A             1.16e+000       2.20e+000       1.10e+002       N/A
25      N/A             1.17e+000       2.22e+000       1.16e+002       N/A
26      N/A             1.18e+000       2.23e+000       1.22e+002       N/A
27      N/A             1.19e+000       2.25e+000       1.28e+002       N/A
28      N/A             1.20e+000       2.27e+000       1.35e+002       N/A
29      N/A             1.21e+000       2.28e+000       1.41e+002       N/A
30      N/A             1.22e+000       2.29e+000       1.47e+002       N/A
31      N/A             1.23e+000       2.31e+000       1.54e+002       N/A
32      N/A             1.24e+000       2.32e+000       1.60e+002       N/A
33      N/A             1.25e+000       2.33e+000       1.66e+002       N/A
34      N/A             1.26e+000       2.35e+000       1.73e+002       N/A
35      N/A             1.27e+000       2.36e+000       1.80e+002       N/A
36      N/A             1.28e+000       2.37e+000       1.86e+002       N/A
37      N/A             1.28e+000       2.38e+000       1.93e+002       N/A
38      N/A             1.29e+000       2.39e+000       1.99e+002       N/A
```



```
38      N/A             1.29e+000       2.39e+000       1.99e+002       N/A
39      N/A             1.30e+000       2.40e+000       2.06e+002       N/A
40      N/A             1.31e+000       2.41e+000       2.13e+002       N/A
41      N/A             1.31e+000       2.42e+000       2.20e+002       N/A
42      N/A             1.32e+000       2.43e+000       2.26e+002       N/A
43      N/A             1.32e+000       2.44e+000       2.33e+002       N/A
44      N/A             1.33e+000       2.45e+000       2.40e+002       N/A
45      N/A             1.34e+000       2.46e+000       2.47e+002       N/A
46      N/A             1.34e+000       2.47e+000       2.54e+002       N/A
47      N/A             1.35e+000       2.47e+000       2.61e+002       N/A
48      N/A             1.35e+000       2.48e+000       2.68e+002       N/A
49      N/A             1.36e+000       2.49e+000       2.75e+002       N/A
50      N/A             1.36e+000       2.50e+000       2.82e+002       N/A
51      N/A             1.37e+000       2.50e+000       2.89e+002       N/A
52      N/A             1.37e+000       2.51e+000       2.96e+002       N/A
53      N/A             1.38e+000       2.52e+000       3.04e+002       N/A
54      N/A             1.38e+000       2.52e+000       3.11e+002       N/A
55      N/A             1.39e+000       2.53e+000       3.18e+002       N/A
56      N/A             1.39e+000       2.54e+000       3.25e+002       N/A
57      N/A             1.40e+000       2.54e+000       3.32e+002       N/A
58      N/A             1.40e+000       2.55e+000       3.40e+002       N/A
59      N/A             1.41e+000       2.56e+000       3.47e+002       N/A
60      N/A             1.41e+000       2.56e+000       3.54e+002       N/A
61      N/A             1.41e+000       2.57e+000       3.62e+002       N/A
62      N/A             1.42e+000       2.57e+000       3.69e+002       N/A
63      N/A             1.42e+000       2.58e+000       3.77e+002       N/A
64      N/A             1.43e+000       2.58e+000       3.84e+002       N/A
65      N/A             1.43e+000       2.59e+000       3.91e+002       N/A
66      N/A             1.43e+000       2.60e+000       3.99e+002       N/A
67      N/A             1.44e+000       2.60e+000       4.06e+002       N/A
68      N/A             1.44e+000       2.61e+000       4.14e+002       N/A
69      N/A             1.44e+000       2.61e+000       4.21e+002       N/A
70      N/A             1.45e+000       2.62e+000       4.29e+002       N/A
71      N/A             1.45e+000       2.62e+000       4.37e+002       N/A
72      N/A             1.45e+000       2.63e+000       4.44e+002       N/A
73      N/A             1.46e+000       2.63e+000       4.52e+002       N/A
74      N/A             1.46e+000       2.63e+000       4.59e+002       N/A
75      N/A             1.46e+000       2.64e+000       4.67e+002       N/A
76      N/A             1.47e+000       2.64e+000       4.75e+002       N/A
77      N/A             1.47e+000       2.65e+000       4.83e+002       N/A
78      N/A             1.47e+000       2.65e+000       4.90e+002       N/A
79      N/A             1.47e+000       2.66e+000       4.98e+002       N/A
80      N/A             1.48e+000       2.66e+000       5.06e+002       N/A
81      N/A             1.48e+000       2.66e+000       5.14e+002       N/A
82      N/A             1.48e+000       2.67e+000       5.21e+002       N/A
83      N/A             1.49e+000       2.67e+000       5.29e+002       N/A
84      N/A             1.49e+000       2.68e+000       5.37e+002       N/A
85      N/A             1.49e+000       2.68e+000       5.45e+002       N/A
86      N/A             1.49e+000       2.68e+000       5.53e+002       N/A
87      N/A             1.50e+000       2.69e+000       5.61e+002       N/A
```


EXPLORER
LAB
Lab Manuals
LabSessions
a.exe
exp1.cpp
output.csv
OUTLINE
TIMELINE
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
powershell - labsessions
54 N/A 1.38e+000 2.52e+000 3.11e+002 N/A
55 N/A 1.39e+000 2.53e+000 3.18e+002 N/A
56 N/A 1.39e+000 2.54e+000 3.25e+002 N/A
57 N/A 1.40e+000 2.54e+000 3.32e+002 N/A
58 N/A 1.40e+000 2.55e+000 3.40e+002 N/A
59 N/A 1.41e+000 2.56e+000 3.47e+002 N/A
60 N/A 1.41e+000 2.56e+000 3.54e+002 N/A
61 N/A 1.41e+000 2.57e+000 3.62e+002 N/A
62 N/A 1.42e+000 2.57e+000 3.69e+002 N/A
63 N/A 1.42e+000 2.58e+000 3.77e+002 N/A
64 N/A 1.43e+000 2.58e+000 3.84e+002 N/A
65 N/A 1.43e+000 2.59e+000 3.91e+002 N/A
66 N/A 1.43e+000 2.60e+000 3.99e+002 N/A
67 N/A 1.44e+000 2.60e+000 4.06e+002 N/A
68 N/A 1.44e+000 2.61e+000 4.14e+002 N/A
69 N/A 1.44e+000 2.61e+000 4.21e+002 N/A
70 N/A 1.45e+000 2.62e+000 4.29e+002 N/A
71 N/A 1.45e+000 2.62e+000 4.37e+002 N/A
72 N/A 1.45e+000 2.63e+000 4.44e+002 N/A
73 N/A 1.46e+000 2.63e+000 4.52e+002 N/A
74 N/A 1.46e+000 2.63e+000 4.59e+002 N/A
75 N/A 1.46e+000 2.64e+000 4.67e+002 N/A
76 N/A 1.47e+000 2.64e+000 4.75e+002 N/A
77 N/A 1.47e+000 2.65e+000 4.83e+002 N/A
78 N/A 1.47e+000 2.65e+000 4.90e+002 N/A
79 N/A 1.47e+000 2.66e+000 4.98e+002 N/A
80 N/A 1.48e+000 2.66e+000 5.06e+002 N/A
81 N/A 1.48e+000 2.66e+000 5.14e+002 N/A
82 N/A 1.48e+000 2.67e+000 5.21e+002 N/A
83 N/A 1.49e+000 2.67e+000 5.29e+002 N/A
84 N/A 1.49e+000 2.68e+000 5.37e+002 N/A
85 N/A 1.49e+000 2.68e+000 5.45e+002 N/A
86 N/A 1.49e+000 2.68e+000 5.53e+002 N/A
87 N/A 1.50e+000 2.69e+000 5.61e+002 N/A
88 N/A 1.50e+000 2.69e+000 5.68e+002 N/A
89 N/A 1.50e+000 2.70e+000 5.76e+002 N/A
90 N/A 1.50e+000 2.70e+000 5.84e+002 N/A
91 N/A 1.51e+000 2.70e+000 5.92e+002 N/A
92 N/A 1.51e+000 2.71e+000 6.00e+002 N/A
93 N/A 1.51e+000 2.71e+000 6.08e+002 N/A
94 N/A 1.51e+000 2.71e+000 6.16e+002 N/A
95 N/A 1.52e+000 2.72e+000 6.24e+002 N/A
96 N/A 1.52e+000 2.72e+000 6.32e+002 N/A
97 N/A 1.52e+000 2.72e+000 6.40e+002 N/A
98 N/A 1.52e+000 2.73e+000 6.48e+002 N/A
99 N/A 1.52e+000 2.73e+000 6.56e+002 N/A
100 N/A 1.53e+000 2.73e+000 6.64e+002 N/A
Data has been written to output.csv
PS C:\Mahadev\S.E\Sem 4\DAA\Lab\labsessions>

EXCEL OUTPUT :

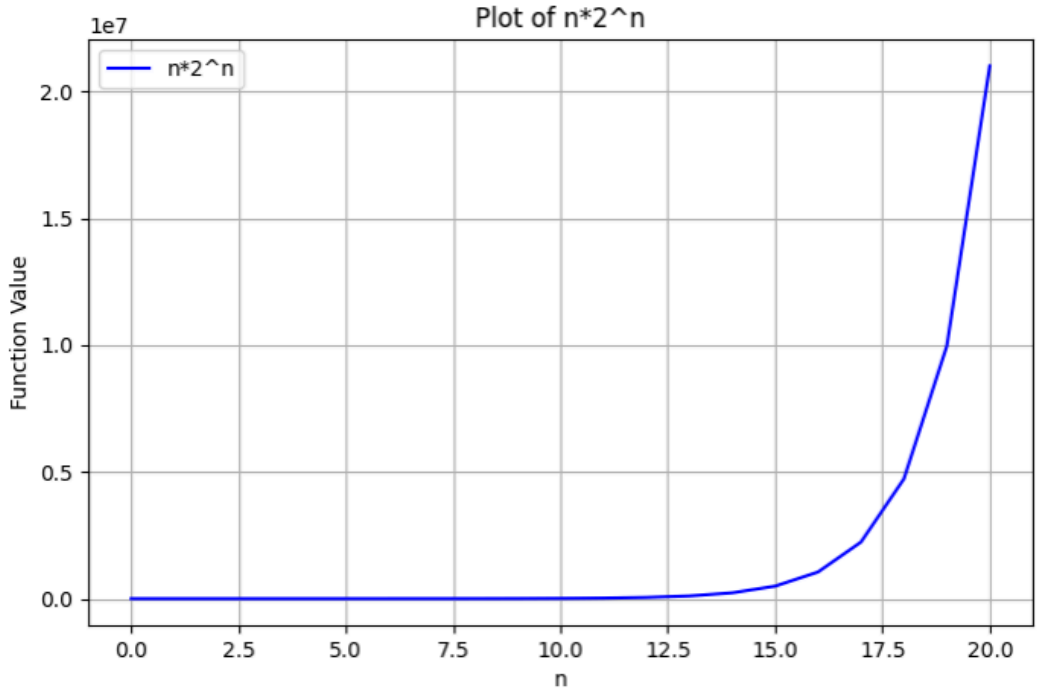
	A	B	C	D	E	F	G	H	I	J	K	L
1	n	Factorial	Cube	Natural Log	Log Base 2 (	Exponentia	Power of 2	ln(ln(n))	lg(lg(n))	n*lg(n)	n*2^n	
2	0	1.00E+00	0.00E+00	N/A	N/A	1.00E+00	1.00E+00	N/A	N/A	0.00E+00	0.00E+00	
3	1	1.00E+00	1.00E+00	0.00E+00	0.00E+00	2.72E+00	2.00E+00	N/A	N/A	0.00E+00	2.00E+00	
4	2	2.00E+00	8.00E+00	6.93E-01	1.00E+00	7.39E+00	4.00E+00	-3.67E-01	0.00E+00	2.00E+00	8.00E+00	
5	3	6.00E+00	2.70E+01	1.10E+00	1.58E+00	2.01E+01	8.00E+00	9.40E-02	6.64E-01	4.75E+00	2.40E+01	
6	4	2.40E+01	6.40E+01	1.39E+00	2.00E+00	5.46E+01	1.60E+01	3.27E-01	1.00E+00	8.00E+00	6.40E+01	
7	5	1.20E+02	1.25E+02	1.61E+00	2.32E+00	1.48E+02	3.20E+01	4.76E-01	1.22E+00	1.16E+01	1.60E+02	
8	6	7.20E+02	2.16E+02	1.79E+00	2.58E+00	4.03E+02	6.40E+01	5.83E-01	1.37E+00	1.55E+01	3.84E+02	
9	7	5.04E+03	3.43E+02	1.95E+00	2.81E+00	1.10E+03	1.28E+02	6.66E-01	1.49E+00	1.97E+01	8.96E+02	
10	8	4.03E+04	5.12E+02	2.08E+00	3.00E+00	2.98E+03	2.56E+02	7.32E-01	1.58E+00	2.40E+01	2.05E+03	
11	9	3.63E+05	7.29E+02	2.20E+00	3.17E+00	8.10E+03	5.12E+02	7.87E-01	1.66E+00	2.85E+01	4.61E+03	
12	10	3.63E+06	1.00E+03	2.30E+00	3.32E+00	2.20E+04	1.02E+03	8.34E-01	1.73E+00	3.32E+01	1.02E+04	
13	11	3.99E+07	1.33E+03	2.40E+00	3.46E+00	5.99E+04	2.05E+03	8.75E-01	1.79E+00	3.81E+01	2.25E+04	
14	12	4.79E+08	1.73E+03	2.48E+00	3.58E+00	1.63E+05	4.10E+03	9.10E-01	1.84E+00	4.30E+01	4.92E+04	
15	13	6.23E+09	2.20E+03	2.56E+00	3.70E+00	4.42E+05	8.19E+03	9.42E-01	1.89E+00	4.81E+01	1.06E+05	
16	14	8.72E+10	2.74E+03	2.64E+00	3.81E+00	1.20E+06	1.64E+04	9.70E-01	1.93E+00	5.33E+01	2.29E+05	
17	15	1.31E+12	3.38E+03	2.71E+00	3.91E+00	3.27E+06	3.28E+04	9.96E-01	1.97E+00	5.86E+01	4.92E+05	
18	16	2.09E+13	4.10E+03	2.77E+00	4.00E+00	8.89E+06	6.55E+04	1.02E+00	2.00E+00	6.40E+01	1.05E+06	
19	17	3.56E+14	4.91E+03	2.83E+00	4.09E+00	2.42E+07	1.31E+05	1.04E+00	2.03E+00	6.95E+01	2.23E+06	
20	18	6.40E+15	5.83E+03	2.89E+00	4.17E+00	6.57E+07	2.62E+05	1.06E+00	2.06E+00	7.51E+01	4.72E+06	
21	19	1.22E+17	6.86E+03	2.94E+00	4.25E+00	1.78E+08	5.24E+05	1.08E+00	2.09E+00	8.07E+01	9.96E+06	
22	20	2.43E+18	8.00E+03	3.00E+00	4.32E+00	4.85E+08	1.05E+06	1.10E+00	2.11E+00	8.64E+01	2.10E+07	
23	21	N/A	9.26E+03	3.04E+00	4.39E+00	N/A	N/A	1.11E+00	2.13E+00	9.22E+01	N/A	
24	22	N/A	1.06E+04	3.09E+00	4.46E+00	N/A	N/A	1.13E+00	2.16E+00	9.81E+01	N/A	
25	23	N/A	1.22E+04	3.14E+00	4.52E+00	N/A	N/A	1.14E+00	2.18E+00	1.04E+02	N/A	
26	24	N/A	1.38E+04	3.18E+00	4.58E+00	N/A	N/A	1.16E+00	2.20E+00	1.10E+02	N/A	
27	25	N/A	1.56E+04	3.22E+00	4.64E+00	N/A	N/A	1.17E+00	2.22E+00	1.16E+02	N/A	
28	26	N/A	1.76E+04	3.26E+00	4.70E+00	N/A	N/A	1.18E+00	2.23E+00	1.22E+02	N/A	
29	27	N/A	1.97E+04	3.30E+00	4.75E+00	N/A	N/A	1.19E+00	2.25E+00	1.28E+02	N/A	
30	28	N/A	2.20E+04	3.33E+00	4.81E+00	N/A	N/A	1.20E+00	2.27E+00	1.35E+02	N/A	
31	29	N/A	2.44E+04	3.37E+00	4.86E+00	N/A	N/A	1.21E+00	2.28E+00	1.41E+02	N/A	
32	30	N/A	2.70E+04	3.40E+00	4.91E+00	N/A	N/A	1.22E+00	2.29E+00	1.47E+02	N/A	
33	31	N/A	2.98E+04	3.43E+00	4.95E+00	N/A	N/A	1.23E+00	2.31E+00	1.54E+02	N/A	
34	32	N/A	3.28E+04	3.47E+00	5.00E+00	N/A	N/A	1.24E+00	2.32E+00	1.60E+02	N/A	
35	33	N/A	3.59E+04	3.50E+00	5.04E+00	N/A	N/A	1.25E+00	2.33E+00	1.66E+02	N/A	
36	34	N/A	3.93E+04	3.53E+00	5.09E+00	N/A	N/A	1.26E+00	2.35E+00	1.73E+02	N/A	
37	35	N/A	4.29E+04	3.56E+00	5.13E+00	N/A	N/A	1.27E+00	2.36E+00	1.80E+02	N/A	

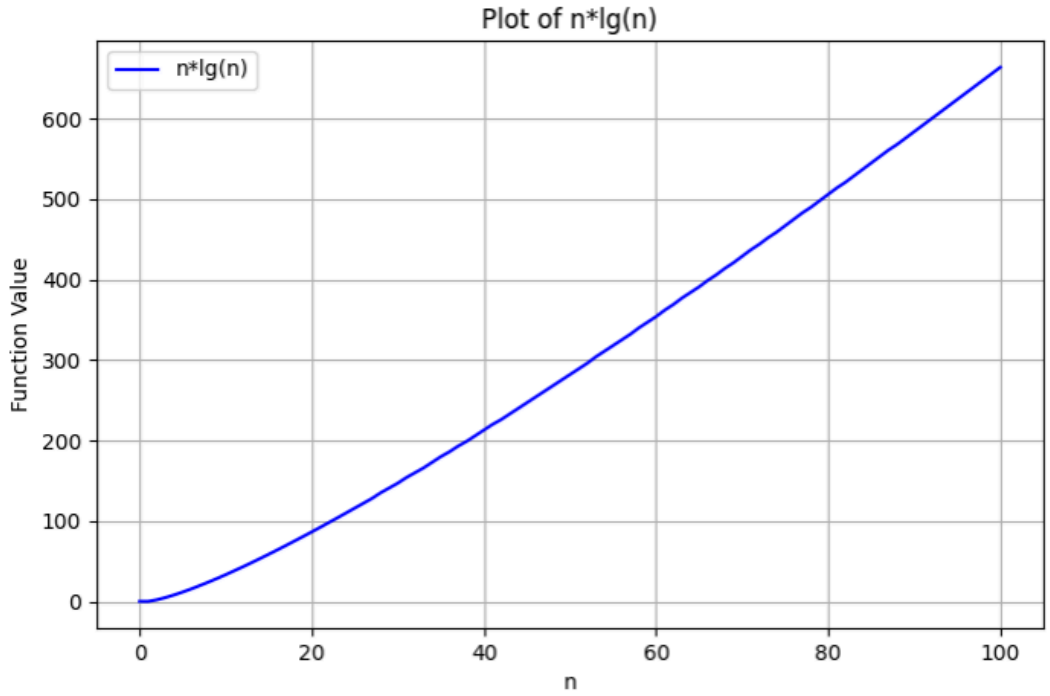
output +

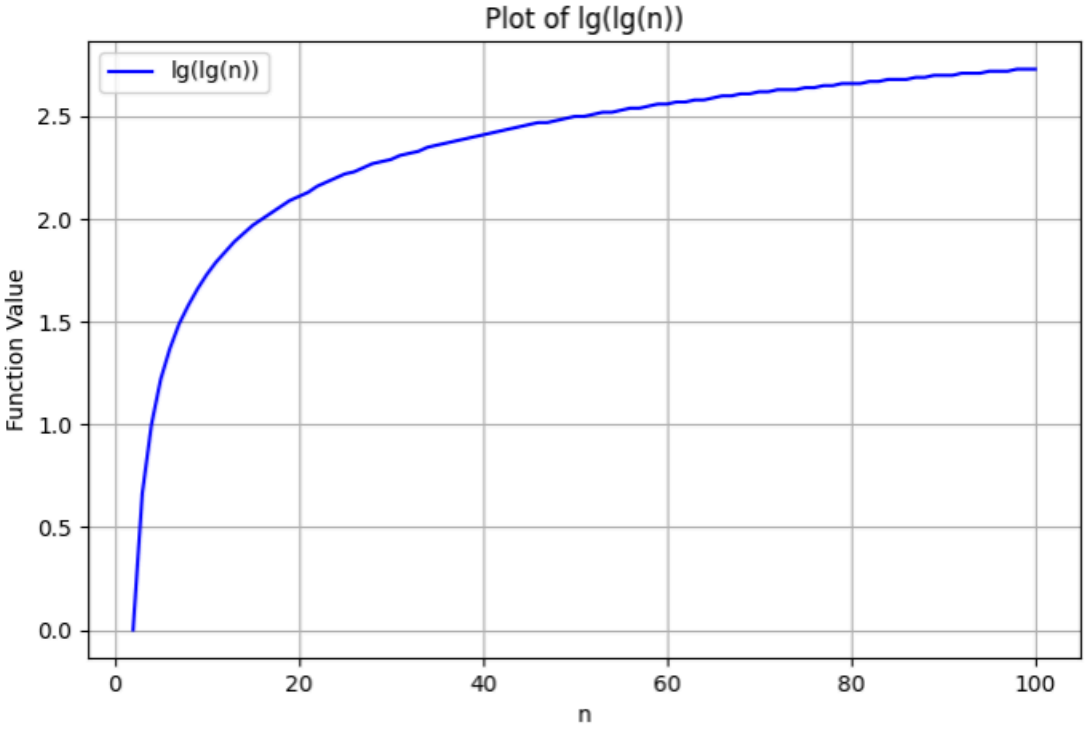
	A	B	C	D	E	F	G	H	I	J	K	L
36	34	N/A	3.93E+04	3.53E+00	5.09E+00	N/A	N/A	1.26E+00	2.35E+00	1.73E+02	N/A	
37	35	N/A	4.29E+04	3.56E+00	5.13E+00	N/A	N/A	1.27E+00	2.36E+00	1.80E+02	N/A	
38	36	N/A	4.67E+04	3.58E+00	5.17E+00	N/A	N/A	1.28E+00	2.37E+00	1.86E+02	N/A	
39	37	N/A	5.07E+04	3.61E+00	5.21E+00	N/A	N/A	1.28E+00	2.38E+00	1.93E+02	N/A	
40	38	N/A	5.49E+04	3.64E+00	5.25E+00	N/A	N/A	1.29E+00	2.39E+00	1.99E+02	N/A	
41	39	N/A	5.93E+04	3.66E+00	5.29E+00	N/A	N/A	1.30E+00	2.40E+00	2.06E+02	N/A	
42	40	N/A	6.40E+04	3.69E+00	5.32E+00	N/A	N/A	1.31E+00	2.41E+00	2.13E+02	N/A	
43	41	N/A	6.89E+04	3.71E+00	5.36E+00	N/A	N/A	1.31E+00	2.42E+00	2.20E+02	N/A	
44	42	N/A	7.41E+04	3.74E+00	5.39E+00	N/A	N/A	1.32E+00	2.43E+00	2.26E+02	N/A	
45	43	N/A	7.95E+04	3.76E+00	5.43E+00	N/A	N/A	1.32E+00	2.44E+00	2.33E+02	N/A	
46	44	N/A	8.52E+04	3.78E+00	5.46E+00	N/A	N/A	1.33E+00	2.45E+00	2.40E+02	N/A	
47	45	N/A	9.11E+04	3.81E+00	5.49E+00	N/A	N/A	1.34E+00	2.46E+00	2.47E+02	N/A	
48	46	N/A	9.73E+04	3.83E+00	5.52E+00	N/A	N/A	1.34E+00	2.47E+00	2.54E+02	N/A	
49	47	N/A	1.04E+05	3.85E+00	5.55E+00	N/A	N/A	1.35E+00	2.47E+00	2.61E+02	N/A	
50	48	N/A	1.11E+05	3.87E+00	5.58E+00	N/A	N/A	1.35E+00	2.48E+00	2.68E+02	N/A	
51	49	N/A	1.18E+05	3.89E+00	5.61E+00	N/A	N/A	1.36E+00	2.49E+00	2.75E+02	N/A	
52	50	N/A	1.25E+05	3.91E+00	5.64E+00	N/A	N/A	1.36E+00	2.50E+00	2.82E+02	N/A	
53	51	N/A	1.33E+05	3.93E+00	5.67E+00	N/A	N/A	1.37E+00	2.50E+00	2.89E+02	N/A	
54	52	N/A	1.41E+05	3.95E+00	5.70E+00	N/A	N/A	1.37E+00	2.51E+00	2.96E+02	N/A	
55	53	N/A	1.49E+05	3.97E+00	5.73E+00	N/A	N/A	1.38E+00	2.52E+00	3.04E+02	N/A	
56	54	N/A	1.57E+05	3.99E+00	5.75E+00	N/A	N/A	1.38E+00	2.52E+00	3.11E+02	N/A	
57	55	N/A	1.66E+05	4.01E+00	5.78E+00	N/A	N/A	1.39E+00	2.53E+00	3.18E+02	N/A	
58	56	N/A	1.76E+05	4.03E+00	5.81E+00	N/A	N/A	1.39E+00	2.54E+00	3.25E+02	N/A	
59	57	N/A	1.85E+05	4.04E+00	5.83E+00	N/A	N/A	1.40E+00	2.54E+00	3.32E+02	N/A	
60	58	N/A	1.95E+05	4.06E+00	5.86E+00	N/A	N/A	1.40E+00	2.55E+00	3.40E+02	N/A	
61	59	N/A	2.05E+05	4.08E+00	5.88E+00	N/A	N/A	1.41E+00	2.56E+00	3.47E+02	N/A	
62	60	N/A	2.16E+05	4.09E+00	5.91E+00	N/A	N/A	1.41E+00	2.56E+00	3.54E+02	N/A	
63	61	N/A	2.27E+05	4.11E+00	5.93E+00	N/A	N/A	1.41E+00	2.57E+00	3.62E+02	N/A	
64	62	N/A	2.38E+05	4.13E+00	5.95E+00	N/A	N/A	1.42E+00	2.57E+00	3.69E+02	N/A	
65	63	N/A	2.50E+05	4.14E+00	5.98E+00	N/A	N/A	1.42E+00	2.58E+00	3.77E+02	N/A	
66	64	N/A	2.62E+05	4.16E+00	6.00E+00	N/A	N/A	1.43E+00	2.58E+00	3.84E+02	N/A	
67	65	N/A	2.75E+05	4.17E+00	6.02E+00	N/A	N/A	1.43E+00	2.59E+00	3.91E+02	N/A	
68	66	N/A	2.87E+05	4.19E+00	6.04E+00	N/A	N/A	1.43E+00	2.60E+00	3.99E+02	N/A	
69	67	N/A	3.01E+05	4.20E+00	6.07E+00	N/A	N/A	1.44E+00	2.60E+00	4.06E+02	N/A	
70	68	N/A	3.14E+05	4.22E+00	6.09E+00	N/A	N/A	1.44E+00	2.61E+00	4.14E+02	N/A	
71	69	N/A	3.29E+05	4.23E+00	6.11E+00	N/A	N/A	1.44E+00	2.61E+00	4.21E+02	N/A	
72	70	N/A	3.43E+05	4.25E+00	6.13E+00	N/A	N/A	1.45E+00	2.62E+00	4.29E+02	N/A	

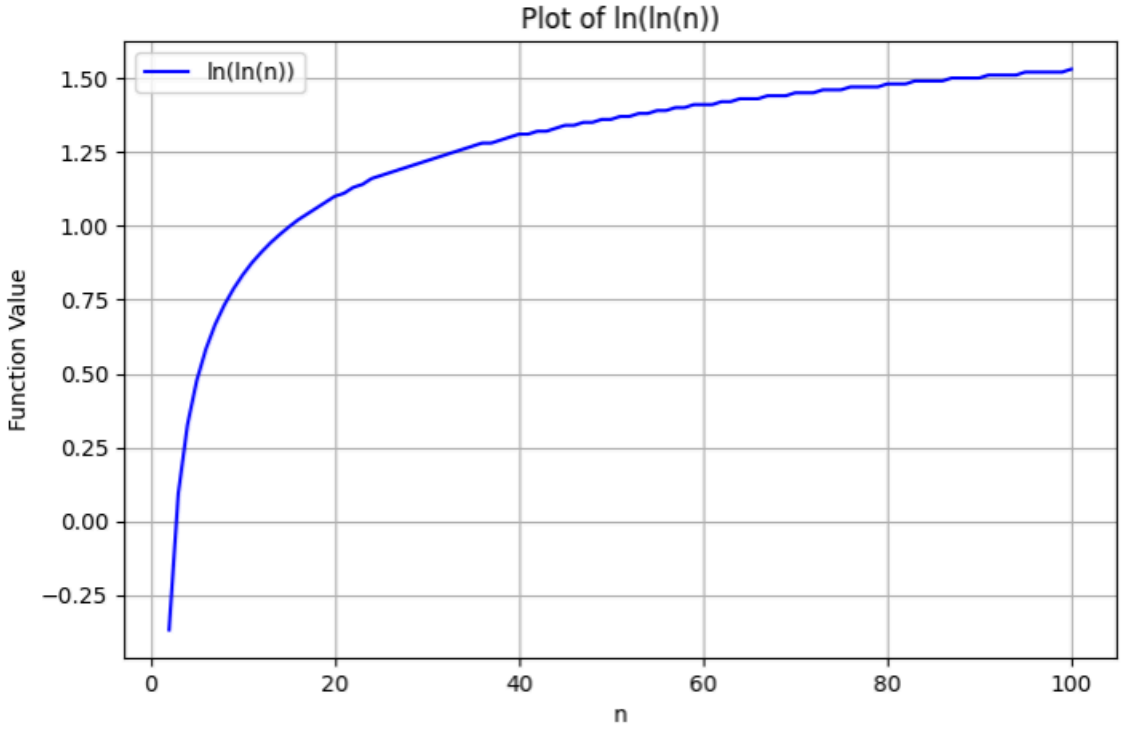
output +

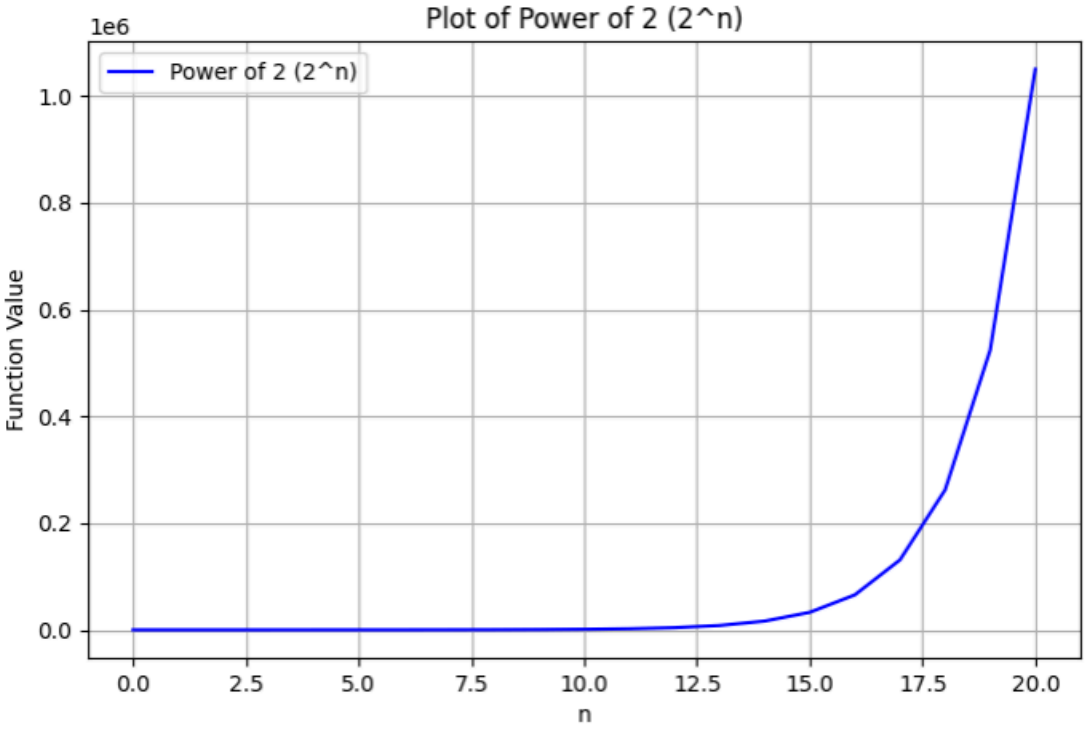
GRAPHS :

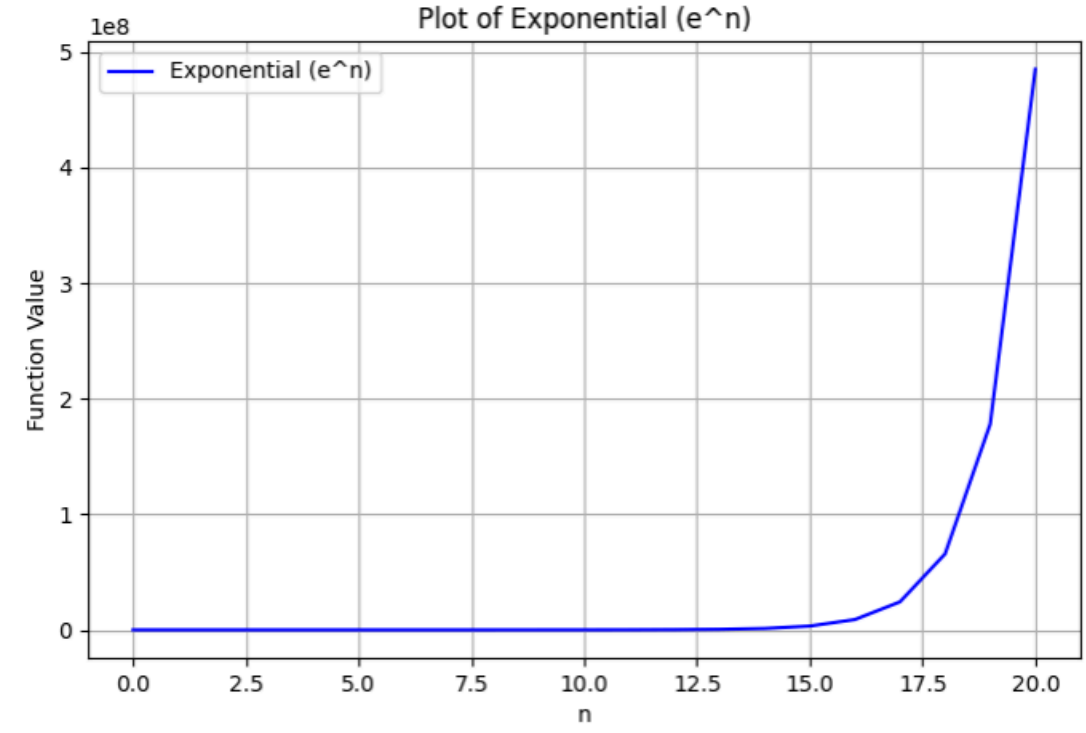

Plot of n*2^n
1e7
n*2^n
2.0
1.5
1.0
0.5
0.0
Function Value
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
n

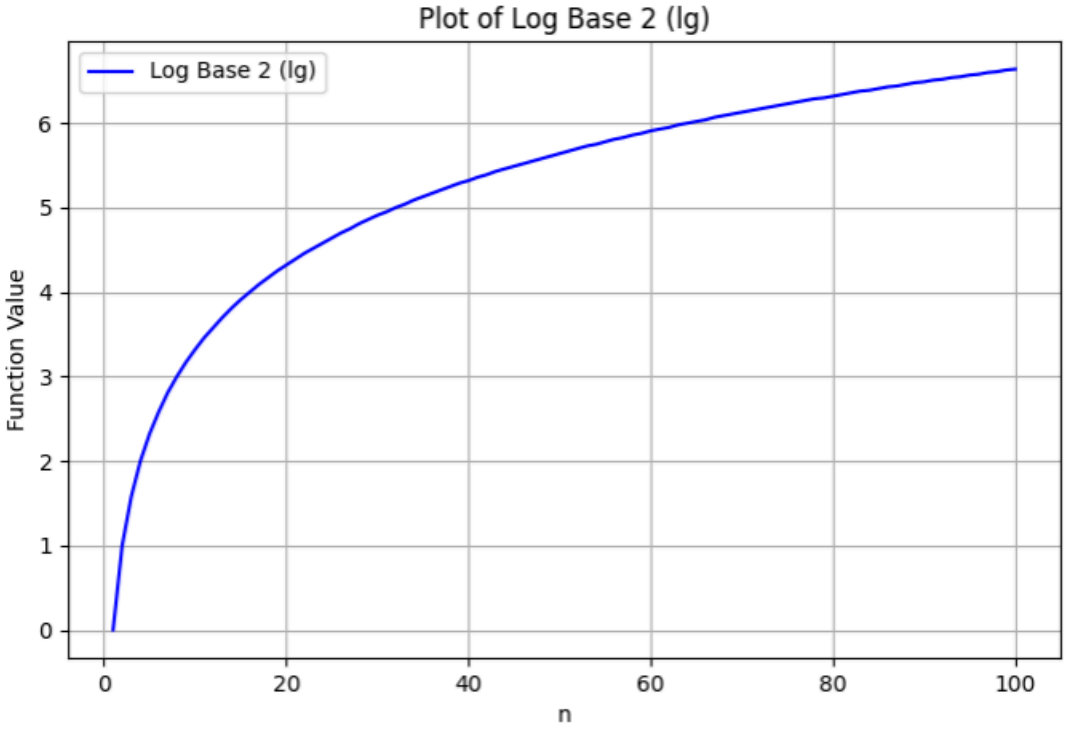

Plot of n*lg(n)
n*lg(n)
600
500
400
300
200
100
0
Function Value
0
20
40
60
80
100
n

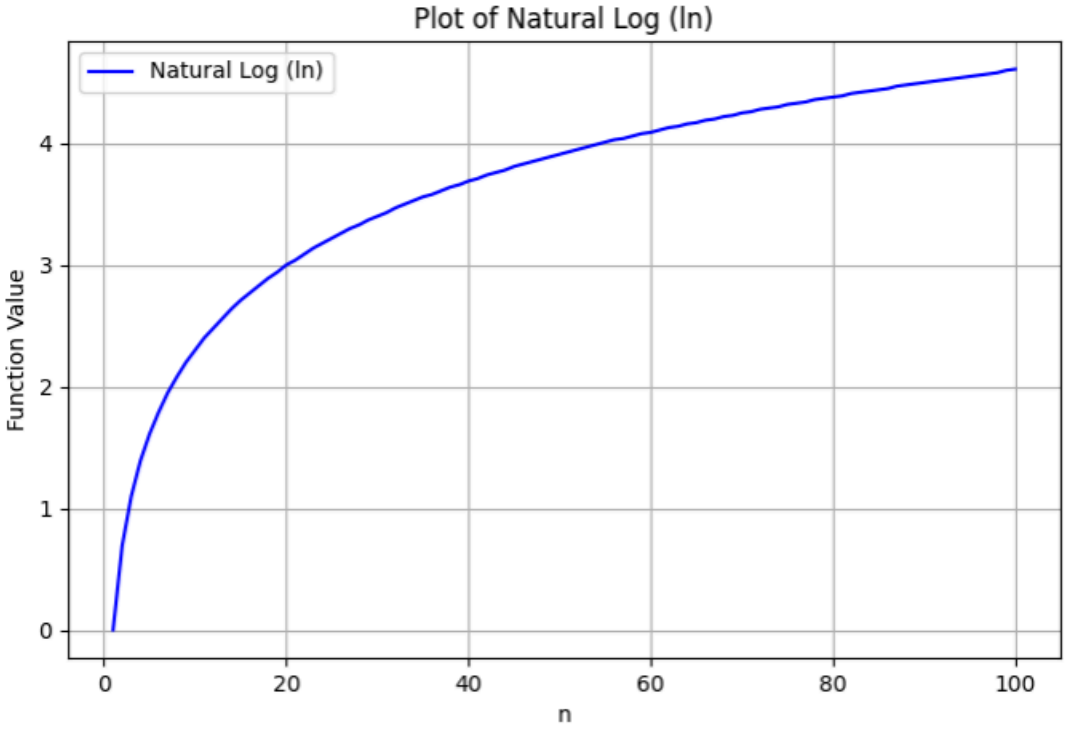

Plot of lg(lg(n))
lg(lg(n))
Function Value
n
0.0
0.5
1.0
1.5
2.0
2.5
0
20
40
60
80
100

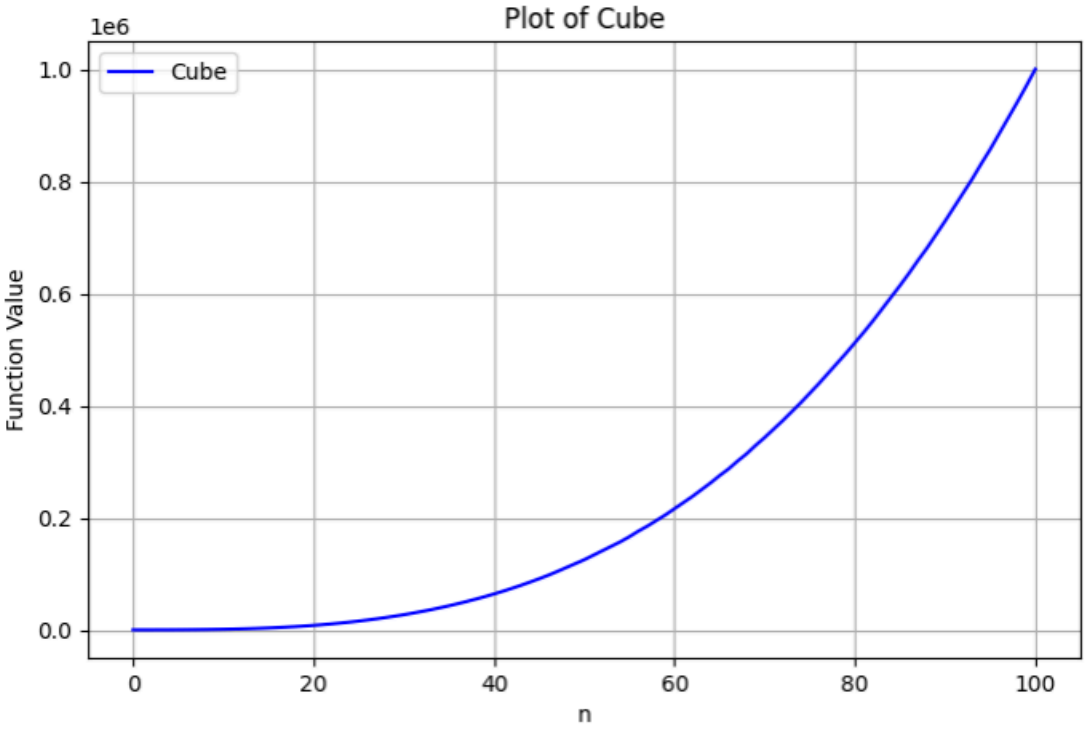

Plot of ln(ln(n))
ln(ln(n))
Function Value
n
−0.25
0.00
0.25
0.50
0.75
1.00
1.25
1.50
0
20
40
60
80
100

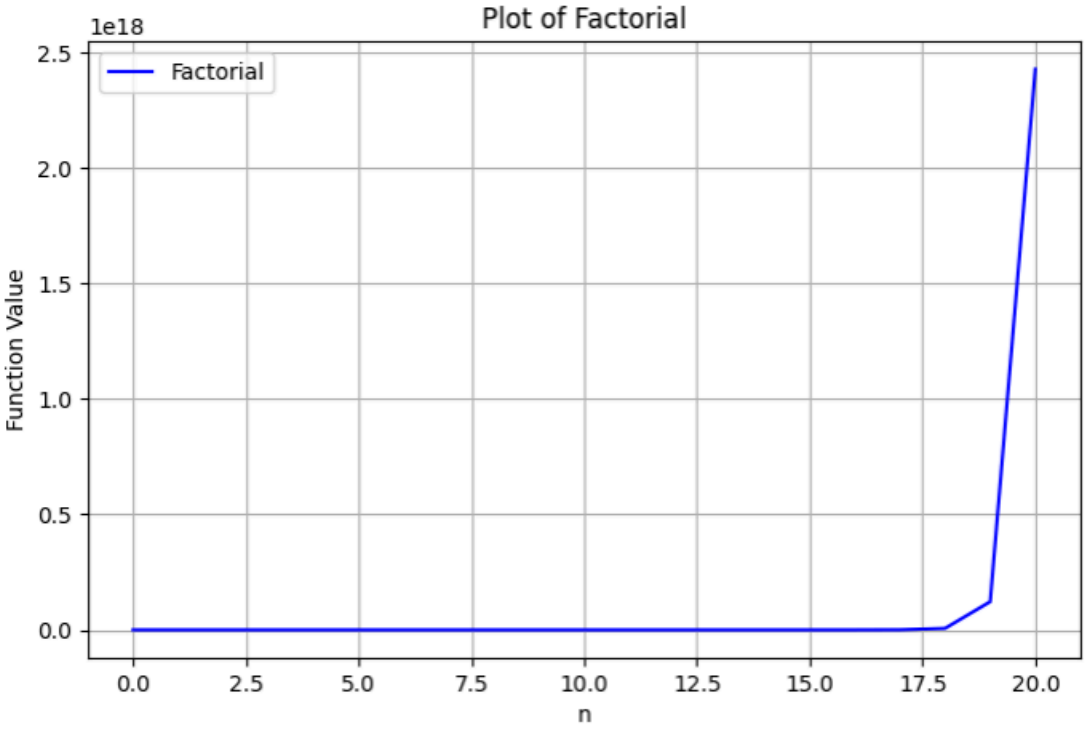

Plot of Power of 2 (2^n)
1e6
Power of 2 (2^n)
Function Value
n
0.0
0.2
0.4
0.6
0.8
1.0
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0


Plot of Exponential (e^n)
1e8
Exponential (e^n)
Function Value
n
0
1
2
3
4
5
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0


Plot of Log Base 2 (lg)
Log Base 2 (lg)
Function Value
n
0
1
2
3
4
5
6
0
20
40
60
80
100


Plot of Natural Log (ln)
Natural Log (ln)
Function Value
n
0
1
2
3
4
0
20
40
60
80
100


Plot of Cube
1e6
Cube
1.0
0.8
0.6
0.4
0.2
0.0
Function Value
0
20
40
60
80
100
n


Plot of Factorial
1e18
Factorial
2.5
2.0
1.5
1.0
0.5
0.0
Function Value
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
n

CONCLUSION:

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Exp - 1

Experience : In this experiment, we were given a set of 24 funcs. & we were to choose any 15 of these & simulate these funcs. of x ranging from 0 to 100. I have thus chosen exponential & logarithmic funcs. I implemented the funcs. by importing & using the in-built methods present in the <math.h> library & the <stdlib.h> library.

Conclusion : I understood the floating point representation as follows - 4155 e+07
(4155: number, 07: exponent)
I also noticed that certain special nos. such as int, numbers are too big for C++ to represent & 'nan' meaning 'not a number'. This experiment helped me visualise the growth rates of different funcs. By plotting, I could see which funcs. grow faster. Thus, it'd be an aid for the forthcoming experiments involving design & analysis of algorithms.