Machine Configuration:

Processor: Intel(R) Core(TM) i3-7100U CPU @ 2.40 GHz

RAM: 4.00 GB

Operating System: Windows 8.1 Pro 64-bit

**Data and Complexity analysis:**

Power Set Power set P(S) of a set S is the set of all subsets of S. If S has n elements in it then P(S) will have 2^n elements.

So to find all subsets the time complexity by bit masking will be O(n\* 2^n) and to print a subset the time complexity will be O(n) . So to find and print all the subset the time complexity is O(n^2 \* 2^n ).

This is an exponential algorithm. So the runtime grows even faster than polynomial algorithm based on n. We see from the table as the number of elements increase the runtime increases greatly.

The data table is attached herewith:

|  |  |
| --- | --- |
| **Number of Elements** | **Time to generate all distinct power set (in miliseconds)** |
| 5 | 1.10E-01 |
| 10 | 2.88256 |
| 15 | 80.838 |
| 20 | 2468.34 |
| 25 | 427389 |

Graph Plots:

The graph for complexity analysis is attached herewith.

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Section: A-2