Machine Configuration:

Processor: Intel(R) Core(TM) i5-8250U CPU

1.60GHz up to 1.80 GHz

RAM: 8.00 GB

Operating System: Windows 10 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 distinct subsets the time complexity will be O(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 microseconds)** |
| 5 | 57 |
| 6 | 88 |
| 7 | 137 |
| 8 | 266 |
| 9 | 496 |
| 10 | 1000 |
| 11 | 1905 |
| 12 | 3714 |
| 13 | 8065 |
| 14 | 15872 |
| 15 | 33443 |
| 16 | 70132 |
| 17 | 146707 |
| 18 | 365017 |
| 19 | 668399 |
| 20 | 1374154 |