**Offline 2-Problem 2**

**Machine Configuration**:

Processor: Intel® Core™ i3-7100 CPU @2.40 GHz

RAM: 12 GB

Operating System: Windows 10 64 bit

**Data and Complexity Analysis:**

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 2n elements.

To find the subsets, time complexity will be O(2n) and to print the subset the time complexity will be O(n). Since the time for printing subsets was not counted , the total time complexity will be 0(2n).

This is an exponential algorithm so the runtime grows faster than polynomial algorithm based on n.

|  |  |  |  |
| --- | --- | --- | --- |
| **Size n** | **Runtime(nanoseconds)** | **Size n** | **Runtime(nanoseconds)** |
|  |  |  |  |
| 1 | 1048 | 16 | 1.7951+E7 |
| 2 | 2456 | 17 | 2.4969+E7 |
| 3 | 3213 | 18 | 8.5768+E7 |
| 4 | 4168 | 19 | 1.36635+E8 |
| 5 | 7314 | 20 | 2.77258+E8 |
| 6 | 17258 | 21 | 5.81441+E8 |
| 7 | 34620 | 22 | 5.78452+E8 |
| 8 | 52398 | 23 | 1.19381+E9 |
| 9 | 140551 | 24 | 4.76126+E9 |
| 10 | 3.955348+E6 | 25 | 6.86897+E9 |
| 11 | 1.001+E6 | 26 | 1.32944+E10 |
| 12 | 1.992+E6 | 27 | 3.89667+E10 |
| 13 | 4.988+E6 | 28 | 7.86536+E10 |
| 14 | 7.979+E6 | 29 | 1.09198+E11 |
| 15 | 1.6952+E7 | 30 | 1.21642+E11 |