Algorithms – Practical 2

Exercise 1: Complete these sentences..

1. Algorithms with time complexities such as n and 100n are called linear algorithms.
2. Algorithms with time complexities such as n2 are called quadratic-time algorithms (**True** or False).
3. Any quadratic-time algorithm is eventually more efficient than any linear-time algorithm (True or **False**).
4. Functions such as 5n2 and 5n2 +100 are called quadratic functions.

|  |  |
| --- | --- |
| T(N) | Growth function |
| n2 | 2 |
| 480 | 6 |
| 2n | 1 |
| logN | 5x |
| 24 | 7 |
| 380N | 3 |
| 1/2N | 4 |

|  |  |
| --- | --- |
| T(N) | Growth function |
| N logN | 4 |
| N4 | 2 |
| 2n | 1 |
| log8N | 5 |
| nlog4N | 4 |
| log2N | 5 |
| nlog6N | 4 |
| 300 | 6 |
| 6N3 | 3 |

## below?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **T(n)** | **Constant** | **Linear** | **Polynomial** | **Exponential** |
| **1** | X |  |  |  |
| **2n3** |  |  | x |  |
| **(4/3)n** |  | x |  |  |
| **2n** |  |  |  | x |
| **4n2** |  |  | x |  |
| **5600** | x |  |  |  |
| **2493n** |  | x |  |  |
| **3/2n** |  |  |  | X |

**Try these ones yourself:**

1. f( n ) = 5n + 12
2. f( n ) = 109
3. f( n ) = n2+ 3n + 112
4. f( n ) = n3 + 1999n + 1337
5. O(n)
6. O(1)
7. O(N^2)
8. O(N^3)

## What is the complexity of the functions below?

1. O(n^2)
2. O(1)
3. O(n)
4. O(n^2)
5. O(n)
6. O(1)
7. O(n^2)
8. O(n)
9. O(n^2)