Assignment 3- Analysis

Question-1- This function prints the Cartesian product of its input array with itself.

Cost Function - 4n^2 + 5n + 2

Barometer Operations: -

- while (j < n)
- cout << "{" << arr[i] << "," << arr[j] << "}";
- j++;
- cout << " ";

O Notation – O(n^2)

Question-2- This function prints a triangle of numbers (which doesn't look very pretty if the numbers have more than one digit).

Cost Function - 3n^2 + 13n + 3

Barometer Operation: -

- while (j <= i)   (within while(i < x) loop)
- cout << j << " ";
- j++;
- while (j <= i)   (within while(i>0) loop)
- cout << j << " ";
- j++;

O Notation - O(n^2)

Question-3- This function returns an array in dynamic memory that represents the matrix that is the result of multiplying the matrix (array) parameter by itself.

Cost Function - $5n^3 + 6n^2 + 4n + 4$

Barometer Operation: -

- while (iNext < rows)
- next += m[rcIndex(r, iNext, columns)] * m[rcIndex(iNext, c, columns)];
- iNext++;

O Notation - $O(n^3)$

Question -4- This function is a recursive version of selection sort.

Cost Function - $2n^2 + 5n - 6$

Barometer Operation: -

- while (next < n)
- if (arr[next] < arr[smallest])
- smallest = next;
- next++;

O Notation - $O(n^2)$

Question-5 - This function prints a pattern.

Cost Function - 3nlogn + 23n – 9

Barometer Operation: -

- while (ast < n)
- cout << "* ";
- ast++;

O Notation - O(nlogn)

Question- 6 - This function is a less than optimal implementation of linear search.

Cost Function - 2(2^(n-1)) +4(2^(n-1)-1) Considering target is the last element in the array.

Barometer Operation: -

- if (len == 0)
- if (arr[0] == target)

O Notation - O(2^n)

Question-7 - This function performs exponentiation.

Cost Function- $5\log n + 7$ (floor value of logn to the base 2 is taken)
n is exp in the above cost function

Barometer Operation: -

- while (exp > 0)
- if (exp & 1)
- ubtret *= base;
- exp >>= 1;
- base = base * base;

O Notation – O(logn)