[ALGORITHMS LAB](https://classroom.google.com/u/4/c/NDg4NjQ2MTUwMDM2)

**Assignment-3**

**Generate n 3d points with x, y, and z greater than zero. Implement the 3D maxima algorithm and visualize the points in a suitable manner. Take n=100 and 1000, compare the running times.**

#include <bits/stdc++.h>

using namespace std;

struct Point

{

    int x, y, z;

};

void findMaximalPoints(Point points[], int n)

{

    for (int i = 0; i < n; i++)

    {

        bool flag = true;

        for (int j = 0; j < n; j++)

        {

            if (i != j and points[i].x <= points[j].x and points[i].y <= points[j].y and points[i].z <= points[j].z)

            {

                flag = false;

                break;

            }

        }

        if (flag)

            cout << points[i].x << "," << points[i].y << "," << points[i].z << " is a Maximal point " << endl;

    }

    cout << "\*\*\*\*\*\*\*\*\*\*\*\*" << endl;

}

int main()

{

    float tim[5];

    int k = 0;

    for (int inputSize = 100; inputSize <= 1000; inputSize \*= 10)

    {

        // Generate "inputSize" random x-points

        int arrX[inputSize], arrY[inputSize], arrZ[inputSize];

        for (int i = 0; i < inputSize; i++)

            arrX[i] = rand() % inputSize + 1;

        // Generate "inputSize" random y-points

        for (int i = 0; i < inputSize; i++)

            arrY[i] = rand() % inputSize + 1;

        // Generate "inputSize" random z-points

        for (int i = 0; i < inputSize; i++)

            arrZ[i] = rand() % inputSize + 1;

        Point points[inputSize];

        for (int i = 0; i < inputSize; i++)

            points[i].x = arrX[i], points[i].y = arrY[i], points[i].z = arrZ[i] ;

        // Perform 10 iterations for every inputSize

        float tot = 0.0;

        for (int i = 0; i < 10; i++)

        {

            clock\_t start, end;

            start = clock();

          findMaximalPoints(points, inputSize);

            end = clock();

            tot += ((double)(end - start));

        }

        cout << "--------------Iteration for inputsize = " << inputSize << " done ---------------" << endl

             << endl;

        tim[k++] = tot / 10;

    }

}

**OUTPUT**

**63,74,99 is a Maximal point**

**96,78,96 is a Maximal point**

**28,98,94 is a Maximal point**

**92,87,24 is a Maximal point**

**96,53,97 is a Maximal point**

**100,92,23 is a Maximal point**

**7,84,99 is a Maximal point**

**49,51,100 is a Maximal point**

**71,97,76 is a Maximal point**

**55,100,90 is a Maximal point**

**77,89,86 is a Maximal point**

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**983,488,998 is a Maximal point**

**906,757,1000 is a Maximal point**

**975,920,499 is a Maximal point**

**994,679,975 is a Maximal point**

**933,858,774 is a Maximal point**

**973,956,126 is a Maximal point**

**851,897,994 is a Maximal point**

**991,860,194 is a Maximal point**

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**749,965,948 is a Maximal point**

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**381,808,999 is a Maximal point**

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**--------------Iteration for inputsize = 1000 done ---------------**