**RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY**

**SESSIONAL TASK-07**

COURSE NAME: SESSIONAL BASED ON CSE-2201

COURSE CODE: CSE-2102

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# Problem Statement: Comparison of bubble sort & counting sort algorithms.

**Code for Bubble Sort Algorithm:**

#include<bits/stdc++.h>

using namespace std;

int main()

{

int cnt,n,i,j,temp,counter;

long long ar[10000],num;

ofstream input;

input.open("input.txt");

for (cnt=1;cnt<=2000;cnt++)

{

n=rand()%2000+1;

input<<n<<endl;

}

input.close();

ifstream file;

file.open("input.txt");

if(file)

{

while(file>>num)

{

ar[n++]=(num);

}

}

else

cout<<"file can't open"<<endl;

int counter1=2;

for(i=0; i<n; i++)

{

counter+=2;

for(j=1; j<n-i; j++)

{

counter+=2;

if(ar[j]>ar[j+1])

{

temp=ar[j];

ar[j]=ar[j+1];

ar[j+1]=temp;

counter=4;

}

}

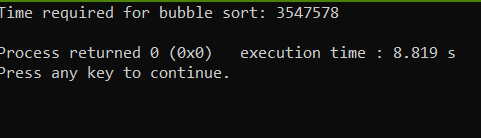
}

counter+=2;

cout<<"Time required for bubble sort: "<<counter<<endl;

}

**Output:**



**Code for Counting Sort Algorithm:**

#include<bits/stdc++.h>

using namespace std;

int main()

{

int cnt,n,i;

long long ar[10000],ar1[10000],num;

ofstream input;

input.open("input.txt");

for (cnt=1;cnt<=2000;cnt++)

{

n=rand()%2000+1;

input<<n<<endl;

}

input.close();

ifstream file;

file.open("input.txt");

if(file)

{

while(file>>num)

{

ar[n++]=(num);

}

}

else

cout<<"file can't open"<<endl;

long long maximum=\*max\_element(ar,ar+n),b[maximum+5];

memset(b,0,sizeof(b));

memset(ar1,0,sizeof(ar1));

for(i=0; i<n; i++)

{

b[ar[i]]++;

}

for(i=1; i<=maximum; i++)

{

b[i]=b[i-1]+b[i];

}

int counter=1;

for(i=n-1; i>=0; i--)

{

ar1[b[ar[i]] - 1] = ar[i];

b[ar[i]]--;

counter+=4;

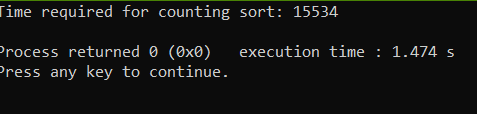
}

counter+=1;

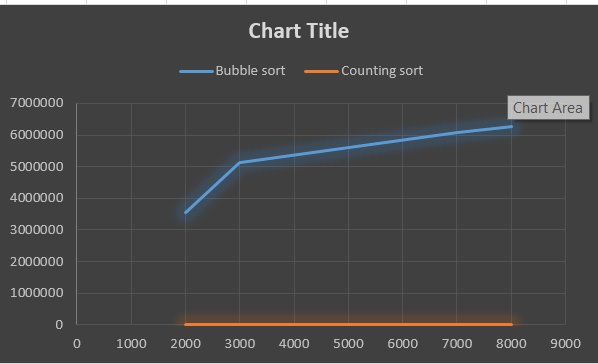
cout<<"Time required for counting sort: "<<counter<<endl;

}

**Output:**

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**Graph:**

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**Discussion:**

We know that the complexity of counting sort is O(n) and bubble sort is O().That means the complexity of counting sort is less than that of bubble sort.We can prove this by the executed output and graph (shown above).In a nutshell,we can say that counting sort is more efficient than bubble sort.

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