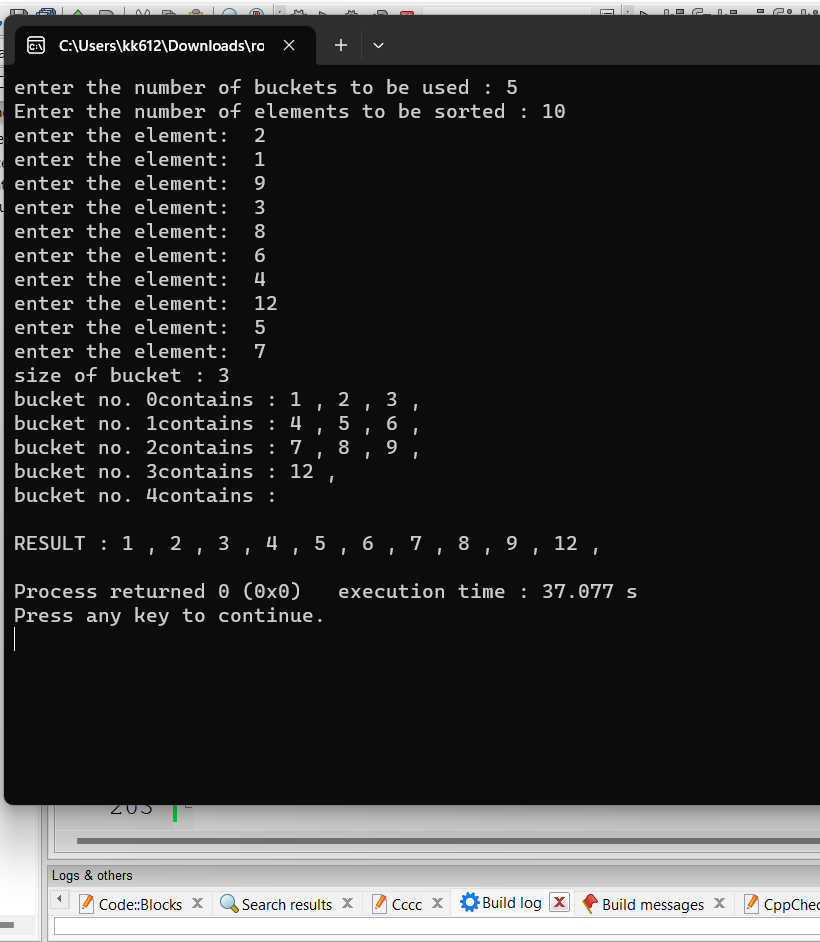
**5. BUCKET SORT**



#include <bits/stdc++.h>

using namespace std;

void insertion\_sort(int \*arr,int size){

for(int i=1;i<size;i++){

int curr =arr[i];

int j = i-1;

int k=i;

while(j>=0 && arr[j] > curr){

//if current is larger smaller than previous than

//shift previous to current

arr[k] = arr[j];

k--;

j--;

}

arr[k] = curr;

}

}

class bucket{

int \*buc;

int n;

int curr;

public:

bucket(){

}

bucket(int s){ //size of 1 bucket

n=s;

buc = new int[n];

curr=0;

}

void print(){

for(int i=0;i<curr;i++){

cout<<buc[i]<<" , ";

}

}

void sort\_me(){

if(curr>1)

insertion\_sort(buc,curr);

}

void set\_data(int s){

n=s;

buc = new int[n];

curr=0;

}

void add(int data){

buc[curr] =data;

curr++;

}

int \*get\_arr(){

return buc;

}

int no\_of\_data\_entered(){

return curr;

}

};

int max(int \*arr,int size){

int ans = arr[0];

for(int i=1;i<size;i++){

if(ans<arr[i]){

ans = arr[i];

}

}

return ans;

}

int min(int \*arr,int size){

int ans = arr[0];

for(int i=1;i<size;i++){

if(ans>arr[i]){

ans = arr[i];

}

}

return ans;

}

void print(bucket \*buckets,int no\_bucket){

for(int i=0,j=0;i<no\_bucket;i++){

cout<<"bucket no. "<<i<<"contains : ";

buckets[i].print();

cout<<endl;

}

}

void print\_arr(int \*arr,int size){

for(int i=0;i<size;i++){

cout<<arr[i]<<" , ";

}

}

void bucket\_sort(int \*arr,const int size,bucket \*buckets,int size\_of\_bucket,int no\_bucket,int start){

for(int i=0;i<size;i++){

buckets[ ((arr[i]-start)/size\_of\_bucket)].add(arr[i]);

}

for(int i=0;i<no\_bucket;i++){

buckets[i].sort\_me();

}

print(buckets,no\_bucket);

//conqour all the buckets

int countt=0;

for(int i=0;i<no\_bucket;i++){

const int \*temp = buckets[i].get\_arr(); //

for(int j=0;j<buckets[i].no\_of\_data\_entered();j++){

arr[countt] = temp[j];

countt++;

}

}

cout<<endl;

cout<<"RESULT : ";

print\_arr(arr,size);

cout<<endl;

}

int main()

{

cout<<"enter the number of buckets to be used : ";

int no\_bucket=0;

cin>>no\_bucket;

cout<<"Enter the number of elements to be sorted : ";

int size=0;

cin>>size;

int \*arr = new int[size];

for(int i=0;i<size;i++){

cout<<"enter the element: ";

cin>>arr[i];

}

int start =min(arr,size);

int size\_of\_bucket = ceil((max(arr,size) - min(arr,size) +1)\*1.0 /no\_bucket\*1.0);

cout<<"size of bucket : "<<size\_of\_bucket<<endl;

bucket \*arr\_bucket = new bucket[no\_bucket];

for(int i=0;i<no\_bucket;i++){

arr\_bucket[i].set\_data(size\_of\_bucket);

}

bucket\_sort(arr,size,arr\_bucket,size\_of\_bucket,no\_bucket,start);

return 0;

}