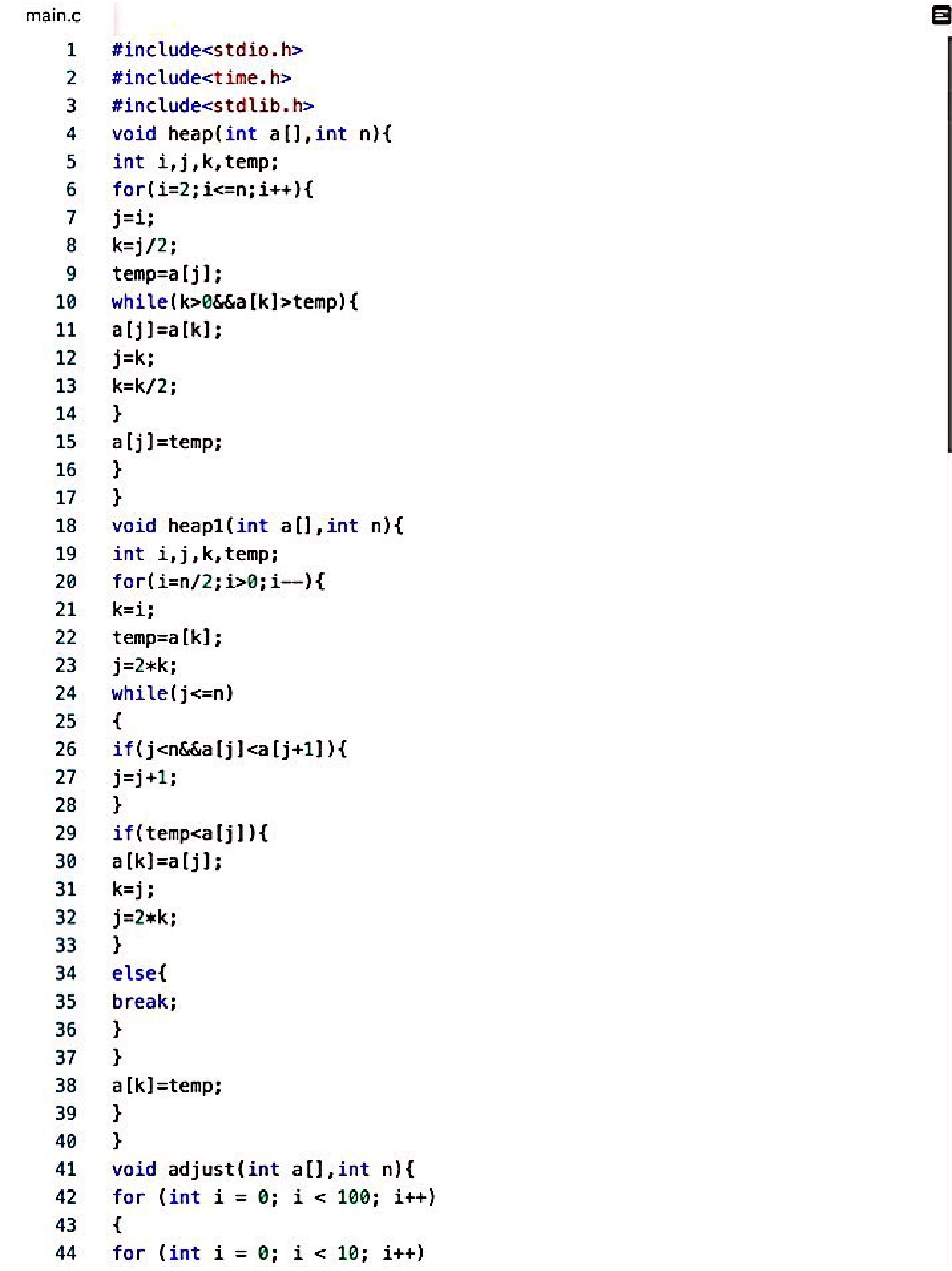
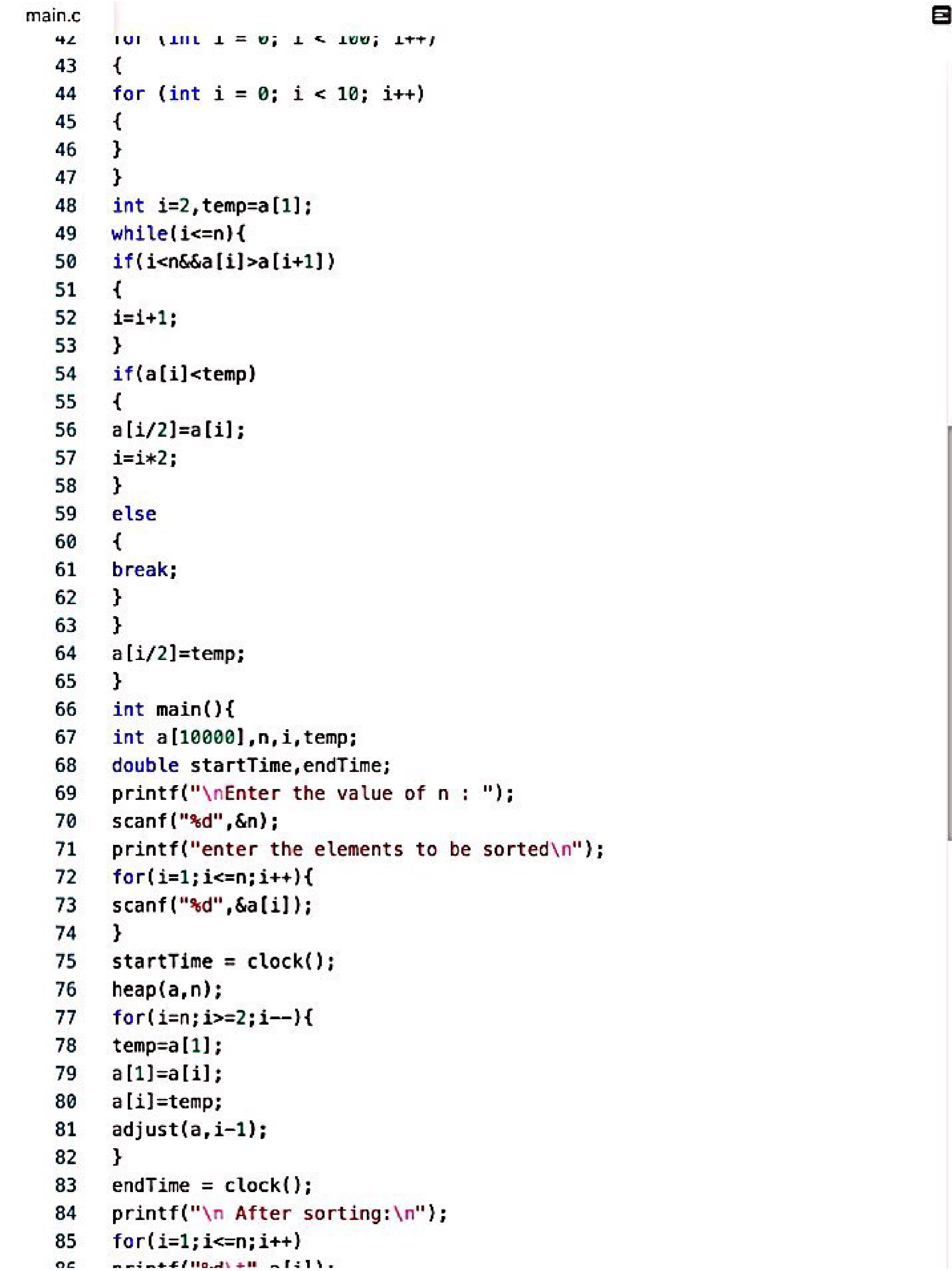
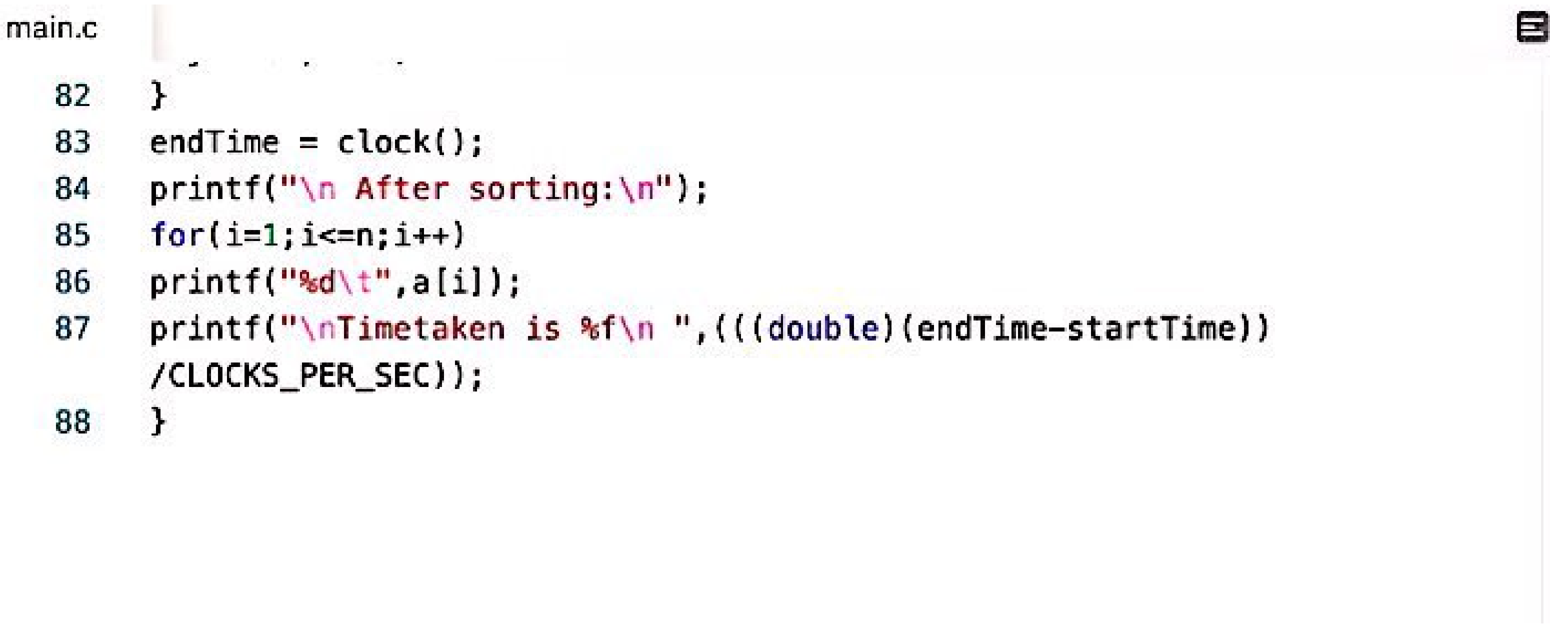


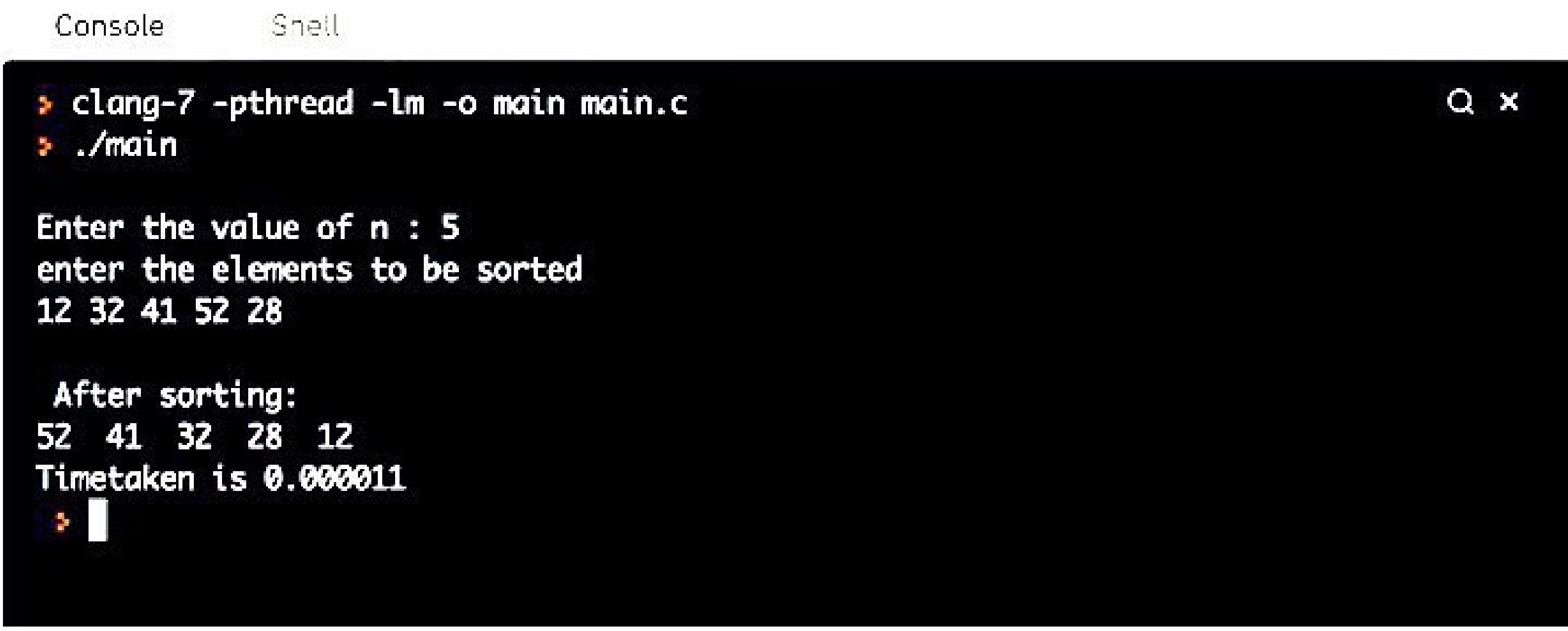
```c
#include<stdio.h>
#include<time.h>
#include<stdlib.h>
void heap(int a[],int n){
int i,j,k,temp;
for(i=2;i<=n;i++){
j=i;
k=j/2;
temp=a[j];
while(k>0&&a[k]>temp){
a[j]=a[k];
j=k;
k=k/2;
}
a[j]=temp;
}
}
void heap1(int a[],int n){
int i,j,k,temp;
for(i=n/2;i>0;i--){
k=i;
temp=a[k];
j=2*k;
while(j<=n)
{
if(j<n&&a[j]<a[j+1]){
j=j+1;
}
if(temp<a[j]){
a[k]=a[j];
k=j;
j=2*k;
}
else{
break;
}
}
a[k]=temp;
}
}
void adjust(int a[],int n){
for (int i = 0; i < 100; i++)
{
for (int i = 0; i < 10; i++)
```



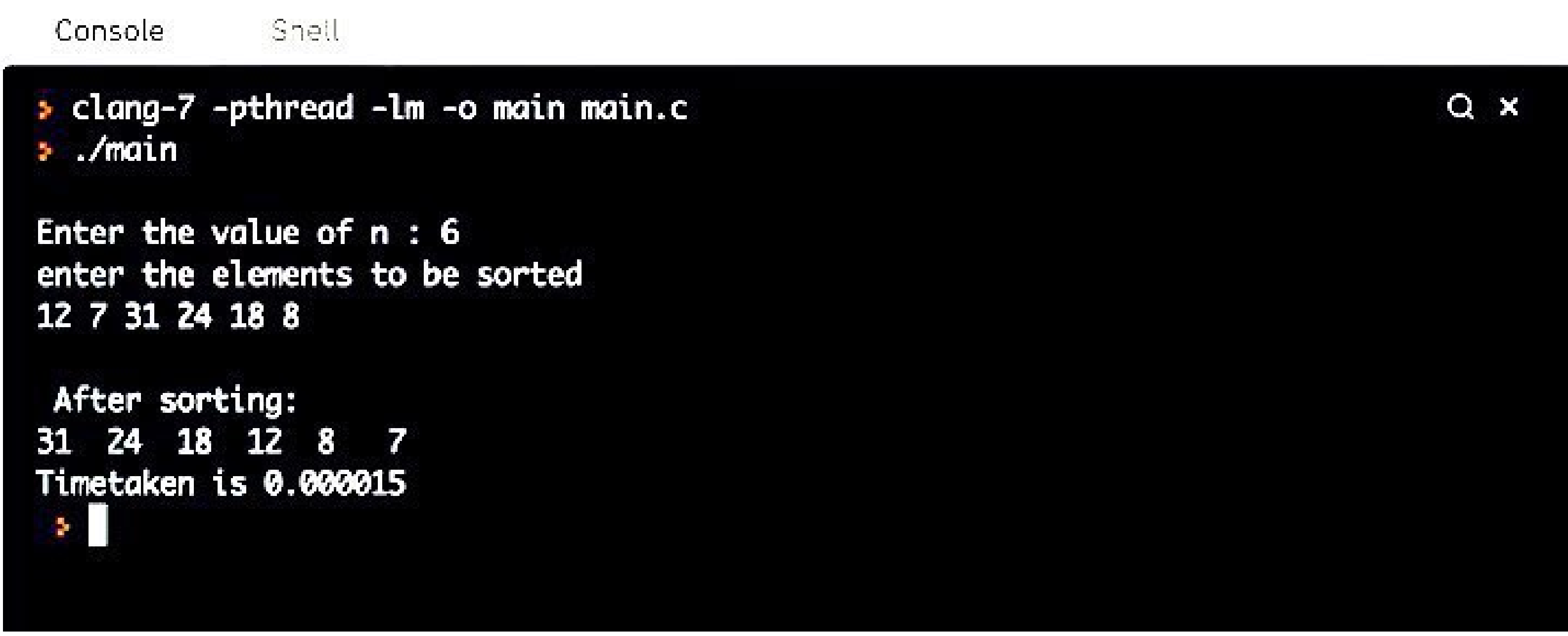
```c
for (int i = 0; i < 100; i++)
{
for (int i = 0; i < 10; i++)
{
}
}
int i=2,temp=a[1];
while(i<=n){
if(i<n&&a[i]>a[i+1])
{
i=i+1;
}
if(a[i]<temp)
{
a[i/2]=a[i];
i=i*2;
}
else
{
break;
}
}
a[i/2]=temp;
}
int main(){
int a[10000],n,i,temp;
double startTime,endTime;
printf("\nEnter the value of n : ");
scanf("%d",&n);
printf("enter the elements to be sorted\n");
for(i=1;i<=n;i++){
scanf("%d",&a[i]);
}
startTime = clock();
heap(a,n);
for(i=n;i>=2;i--){
temp=a[1];
a[1]=a[i];
a[i]=temp;
adjust(a,i-1);
}
endTime = clock();
printf("\n After sorting:\n");
for(i=1;i<=n;i++)
printf("%d\t",a[i]);
```



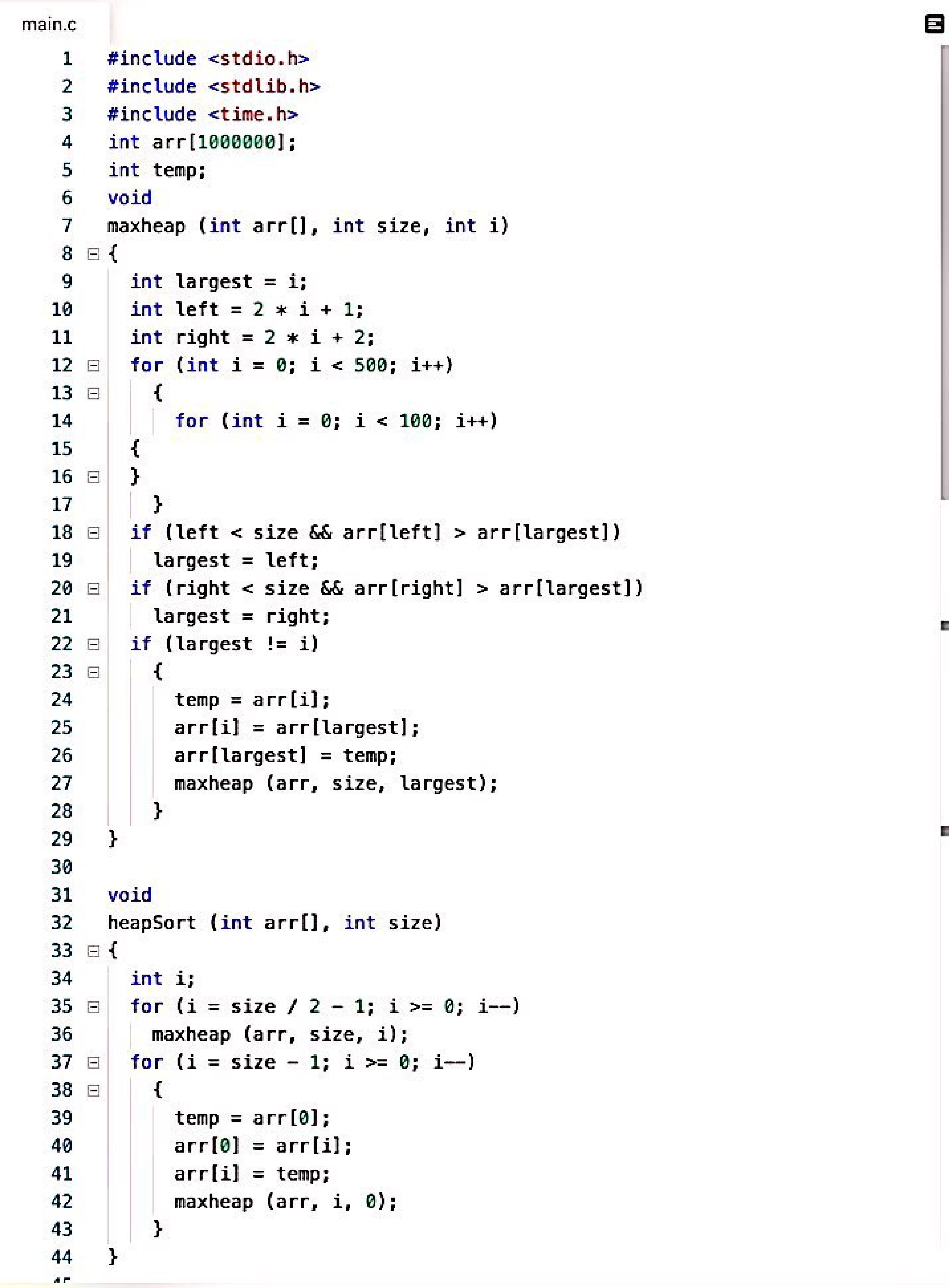
```
}
endTime = clock();
printf("\n After sorting:\n");
for(i=1;i<=n;i++)
printf("%d\t",a[i]);
printf("\nTimetaken is %f\n ",(((double)(endTime-startTime))
/CLOCKS_PER_SEC));
}
```



```
> clang-7 -pthread -lm -o main main.c
> ./main

Enter the value of n : 5
enter the elements to be sorted
12 32 41 52 28

 After sorting:
52  41  32  28  12
Timetaken is 0.000011
 >
```



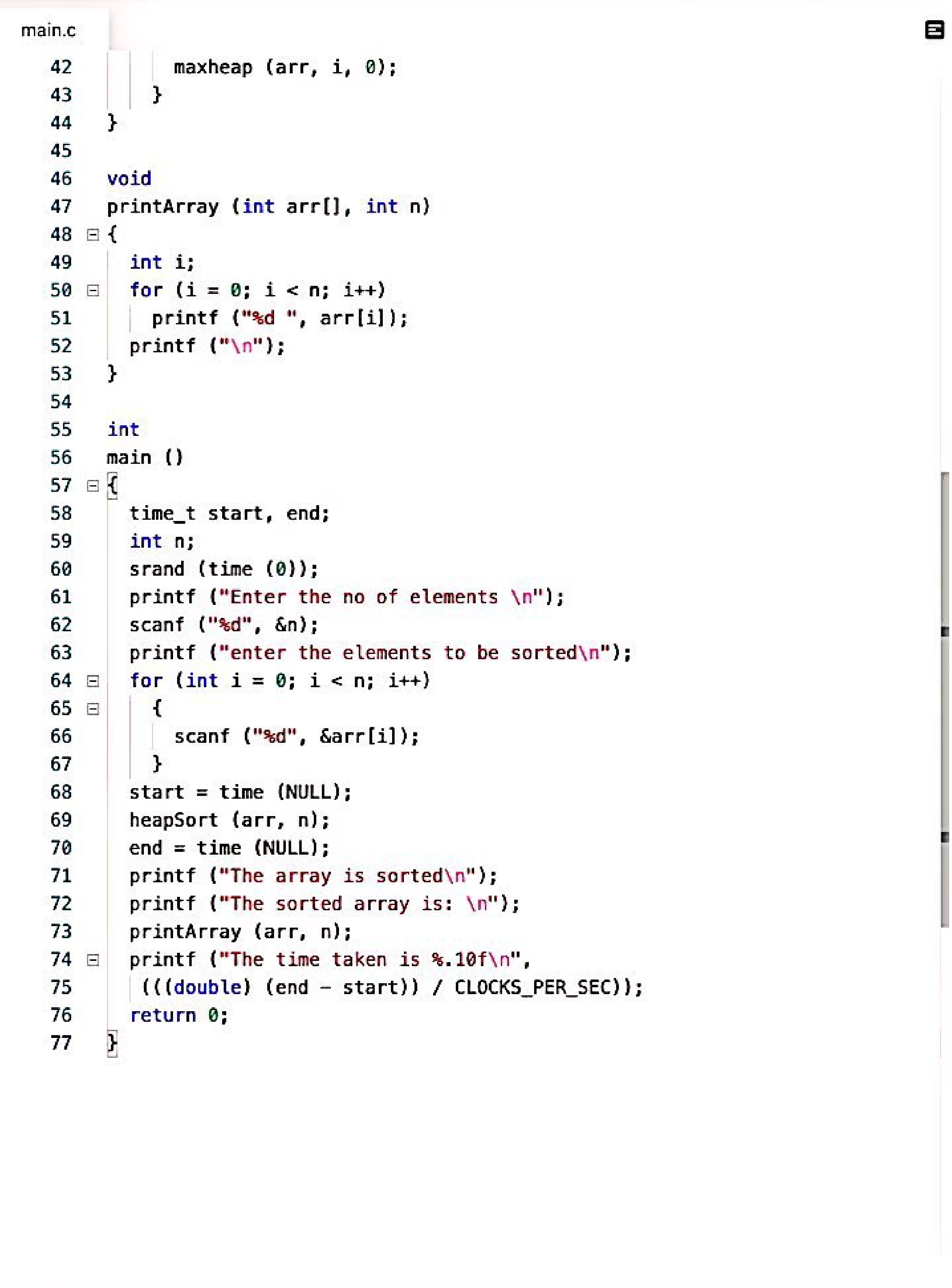
```
> clang-7 -pthread -lm -o main main.c
> ./main

Enter the value of n : 6
enter the elements to be sorted
12 7 31 24 18 8

 After sorting:
31  24  18  12  8   7
Timetaken is 0.000015
 >
```



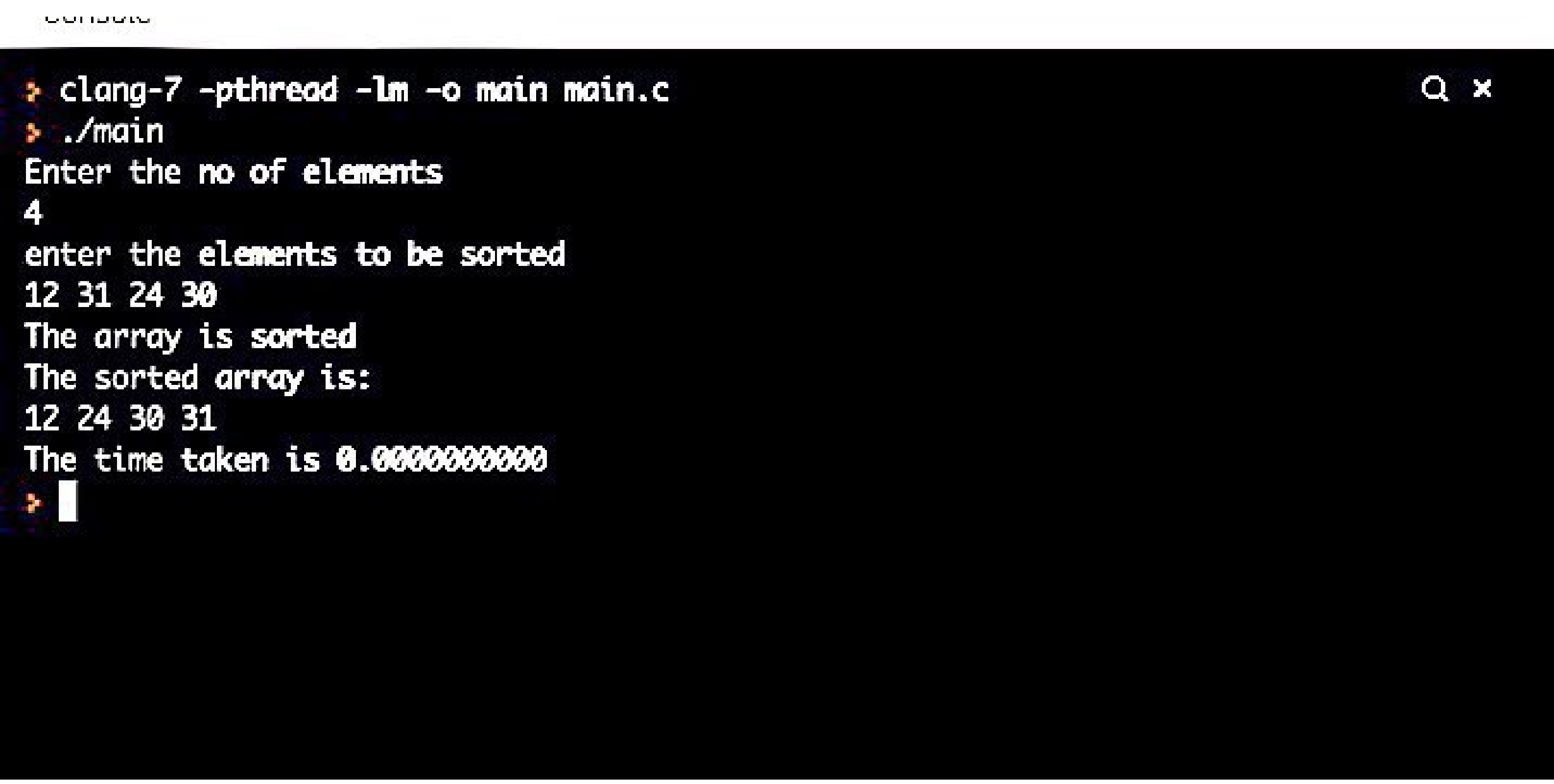
main.c

```c
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
int arr[1000000];
int temp;
void
maxheap (int arr[], int size, int i)
{
  int largest = i;
  int left = 2 * i + 1;
  int right = 2 * i + 2;
  for (int i = 0; i < 500; i++)
    {
      for (int i = 0; i < 100; i++)
  {
  }
    }
  if (left < size && arr[left] > arr[largest])
    largest = left;
  if (right < size && arr[right] > arr[largest])
    largest = right;
  if (largest != i)
    {
      temp = arr[i];
      arr[i] = arr[largest];
      arr[largest] = temp;
      maxheap (arr, size, largest);
    }
}

void
heapSort (int arr[], int size)
{
  int i;
  for (i = size / 2 - 1; i >= 0; i--)
    maxheap (arr, size, i);
  for (i = size - 1; i >= 0; i--)
    {
      temp = arr[0];
      arr[0] = arr[i];
      arr[i] = temp;
      maxheap (arr, i, 0);
    }
}
```

Scanned with CamScanner



```c
      maxheap (arr, i, 0);
    }
}

void
printArray (int arr[], int n)
{
  int i;
  for (i = 0; i < n; i++)
    printf ("%d ", arr[i]);
  printf ("\n");
}

int
main ()
{
  time_t start, end;
  int n;
  srand (time (0));
  printf ("Enter the no of elements \n");
  scanf ("%d", &n);
  printf ("enter the elements to be sorted\n");
  for (int i = 0; i < n; i++)
    {
      scanf ("%d", &arr[i]);
    }
  start = time (NULL);
  heapSort (arr, n);
  end = time (NULL);
  printf ("The array is sorted\n");
  printf ("The sorted array is: \n");
  printArray (arr, n);
  printf ("The time taken is %.10f\n",
   (((double) (end - start)) / CLOCKS_PER_SEC));
  return 0;
}
```



```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter the no of elements
4
enter the elements to be sorted
12 31 24 30
The array is sorted
The sorted array is:
12 24 30 31
The time taken is 0.0000000000
> 
```