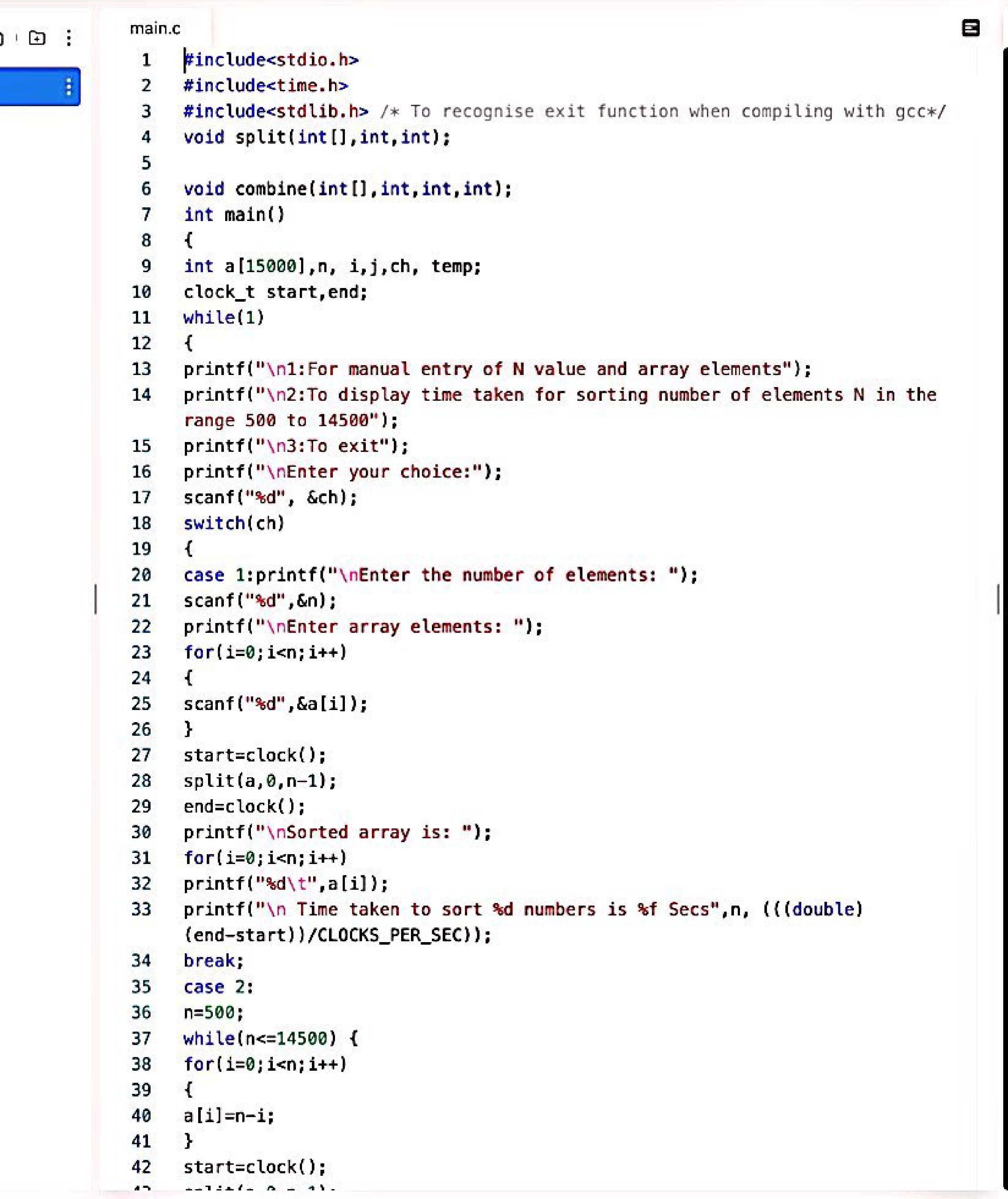
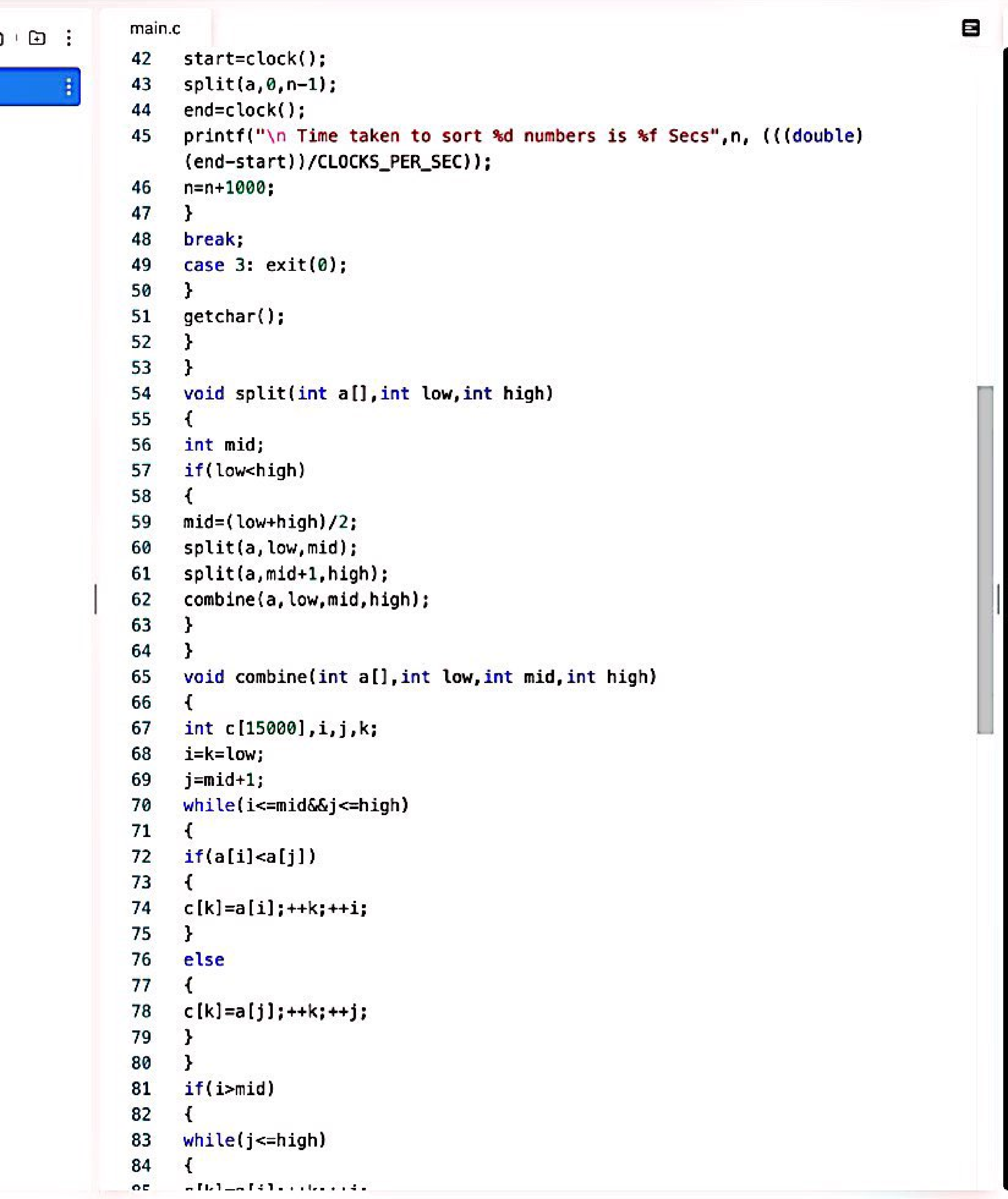
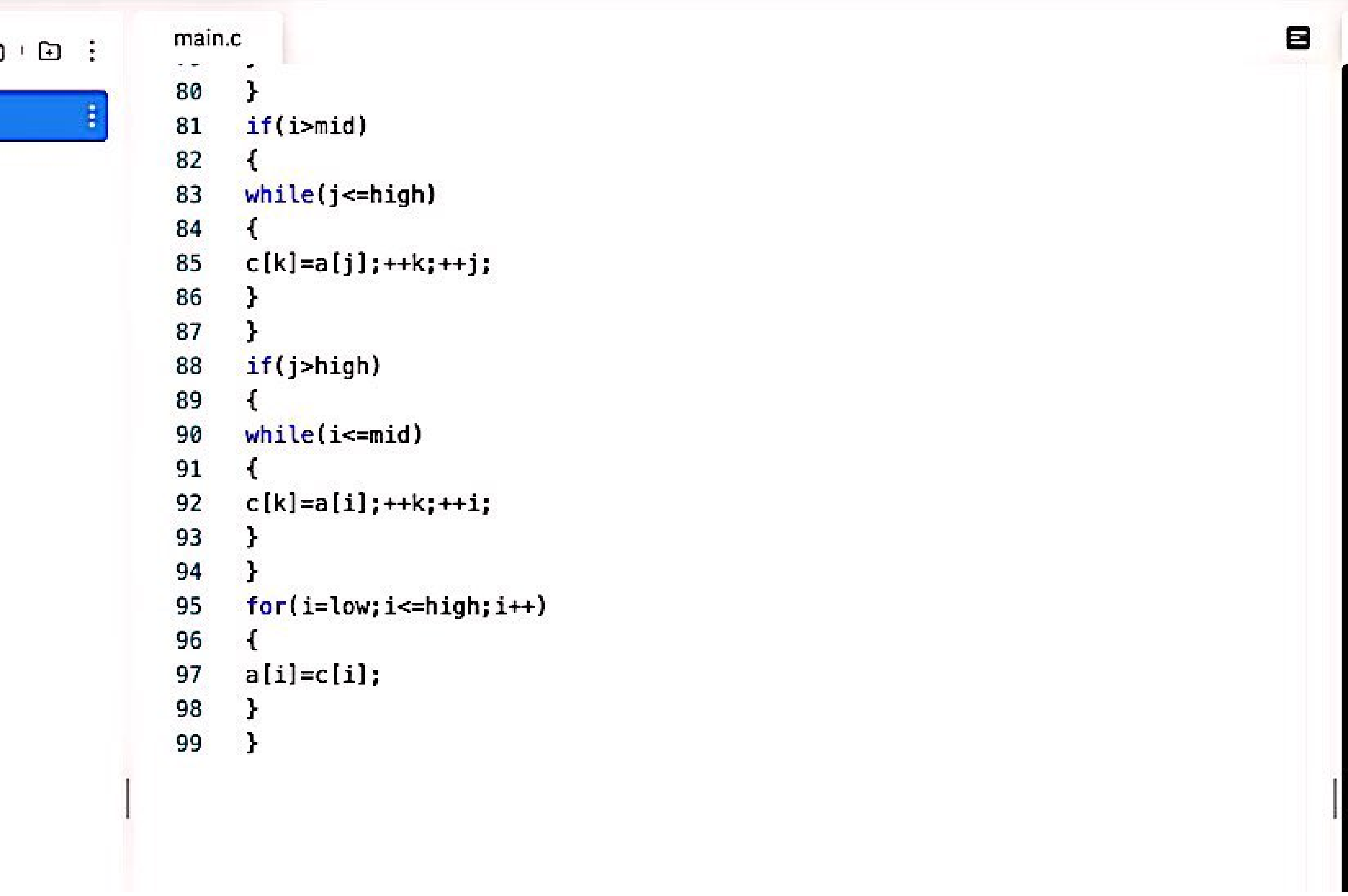


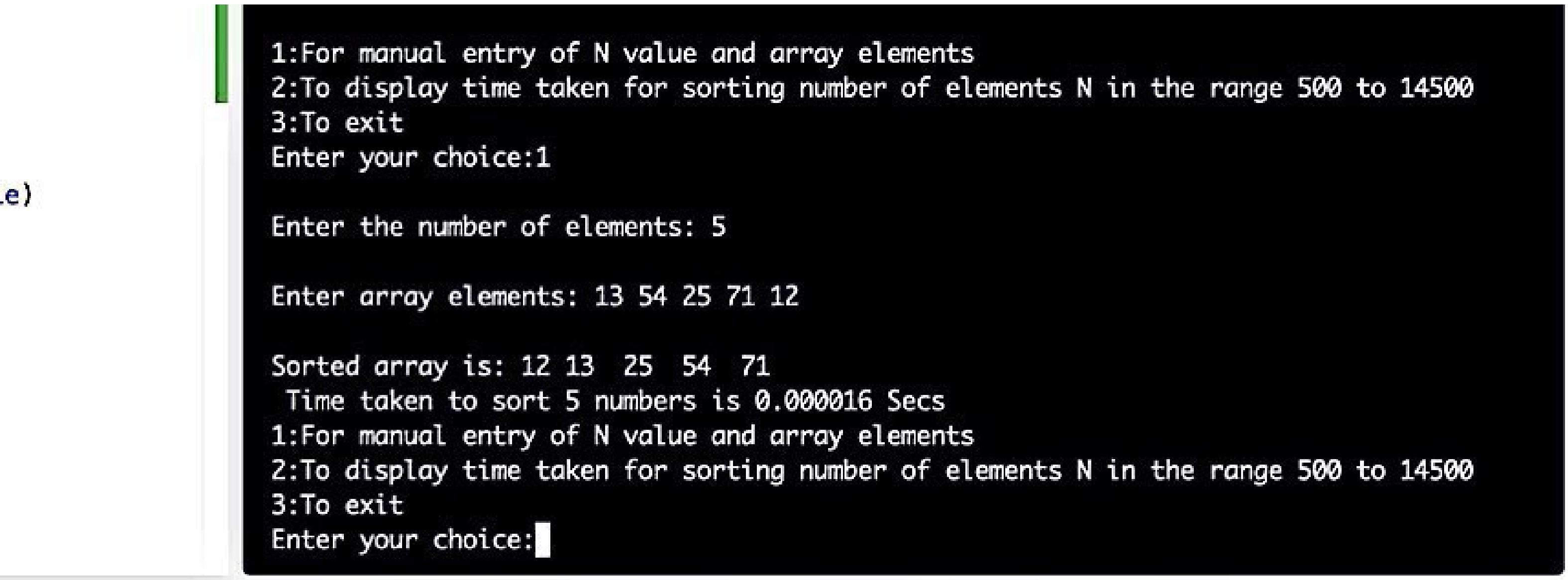
```c
#include<stdio.h>
#include<time.h>
#include<stdlib.h> /* To recognise exit function when compiling with gcc*/
void split(int[],int,int);

void combine(int[],int,int,int);
int main()
{
int a[15000],n, i,j,ch, temp;
clock_t start,end;
while(1)
{
printf("\n1:For manual entry of N value and array elements");
printf("\n2:To display time taken for sorting number of elements N in the range 500 to 14500");
printf("\n3:To exit");
printf("\nEnter your choice:");
scanf("%d", &ch);
switch(ch)
{
case 1:printf("\nEnter the number of elements: ");
scanf("%d",&n);
printf("\nEnter array elements: ");
for(i=0;i<n;i++)
{
scanf("%d",&a[i]);
}
start=clock();
split(a,0,n-1);
end=clock();
printf("\nSorted array is: ");
for(i=0;i<n;i++)
printf("%d\t",a[i]);
printf("\n Time taken to sort %d numbers is %f Secs",n, (((double)(end-start))/CLOCKS_PER_SEC));
break;
case 2:
n=500;
while(n<=14500) {
for(i=0;i<n;i++)
{
a[i]=n-i;
}
start=clock();
split(a,0,n-1);
```



```
start=clock();
split(a,0,n-1);
end=clock();
printf("\n Time taken to sort %d numbers is %f Secs",n, (((double)(end-start))/CLOCKS_PER_SEC));
n=n+1000;
}
break;
case 3: exit(0);
}
getchar();
}
}
void split(int a[],int low,int high)
{
int mid;
if(low<high)
{
mid=(low+high)/2;
split(a,low,mid);
split(a,mid+1,high);
combine(a,low,mid,high);
}
}
void combine(int a[],int low,int mid,int high)
{
int c[15000],i,j,k;
i=k=low;
j=mid+1;
while(i<=mid&&j<=high)
{
if(a[i]<a[j])
{
c[k]=a[i];++k;++i;
}
else
{
c[k]=a[j];++k;++j;
}
}
if(i>mid)
{
while(j<=high)
{
c[k]=a[j];++k;++j;
```

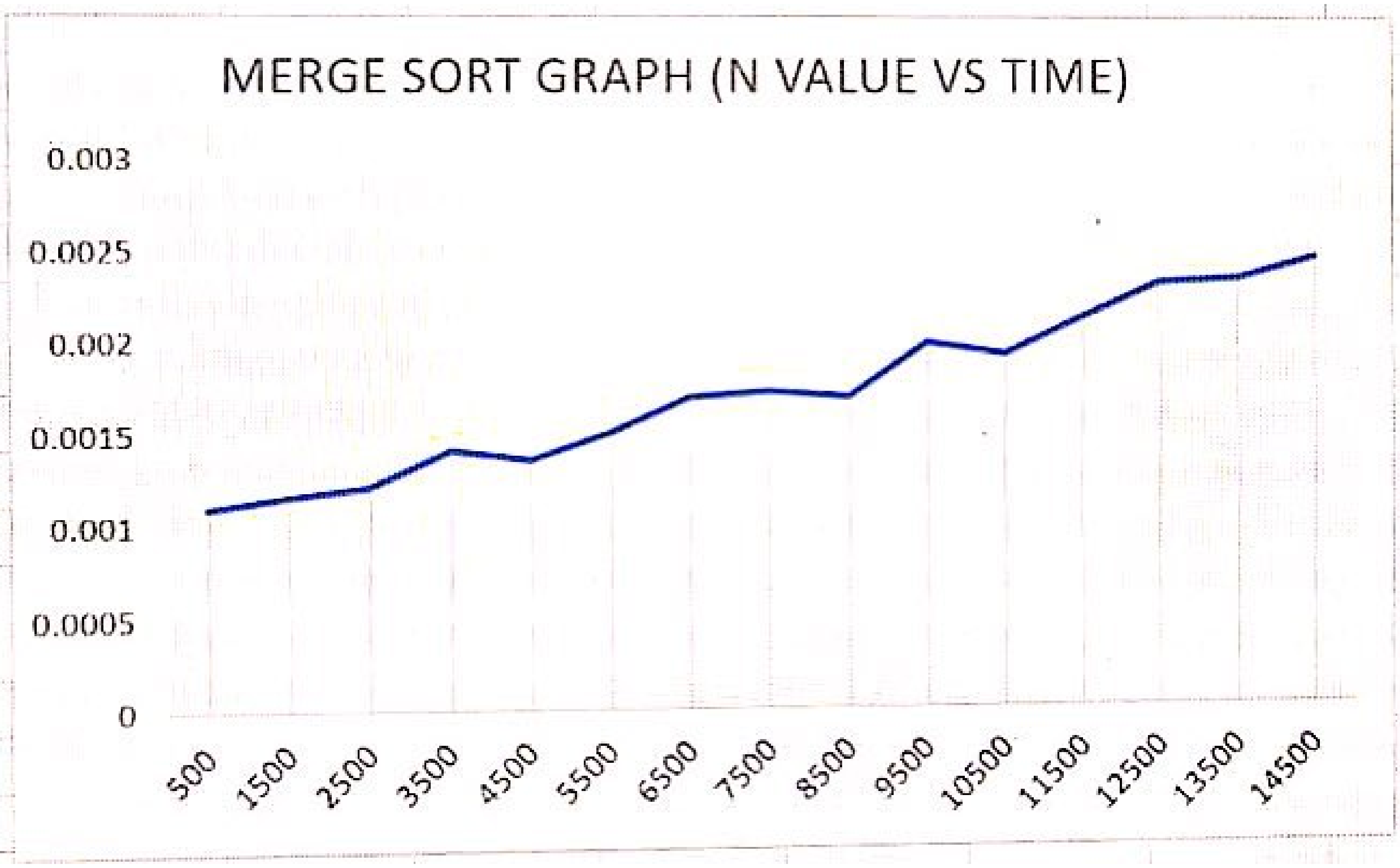


```
}
if(i>mid)
{
while(j<=high)
{
c[k]=a[j];++k;++j;
}
}
if(j>high)
{
while(i<=mid)
{
c[k]=a[i];++k;++i;
}
}
for(i=low;i<=high;i++)
{
a[i]=c[i];
}
}
```



```
.e)
```

```
1:For manual entry of N value and array elements
2:To display time taken for sorting number of elements N in the range 500 to 14500
3:To exit
Enter your choice:1

Enter the number of elements: 5

Enter array elements: 13 54 25 71 12

Sorted array is: 12 13  25  54  71
 Time taken to sort 5 numbers is 0.000016 Secs
1:For manual entry of N value and array elements
2:To display time taken for sorting number of elements N in the range 500 to 14500
3:To exit
Enter your choice:
```


MERGE SORT GRAPH (N VALUE VS TIME)
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
500
1500
2500
3500
4500
5500
6500
7500
8500
9500
10500
11500
12500
13500
14500