30/5/24 Week-5

## Merge sort

```
#include<stdio.h>
#include<time.h>
#include<stdlib.h>
void split(int[],int,int);
void combine(int[],int,int,int);
void 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("\n Sorted array is:");
        for(i=0; i<n; i++)
        printf("%d\t", a[i]);
printf("\nTime 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]=random(1000);
              a[i]=n-i;
              }
          start=clock();
          split(a,0,n-1);
          for(i=0; i<500000; i++) {temp=38/600;}
          end=clock();
     printf("\nTime 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(j>high)
    {
      while(i<=mid) {
       c[k]=a[i];
         ++k;
         ++i;
```

```
          }
       }
    for(i=low; i<=high; i++)
    {
       a[i]=c[i]
    }
   }
```

<u>output:</u>

```
1. For manual entry of N value & 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: 4
Enter array elements: 44. 33 .22 11
Sorted array: 11 22 .33 44.
Time taken to sort 4 numbers is 0:00 secs.

1. For manual entry of N value & array elements.
2. To display time taken for sorting number of elements
N is the range 500 to 14500
3. to exit.
Enter your choice: 2.
Time taken to sort 500 numbers is 0.031000 secs
Time taken to sort 1500 numbers is 0.032000 secs
Time taken to sort 2500 numbers is 0.031000 secs
Time taken to sort 3500 numbers is 0.031000 secs
Time taken to sort 4500 numbers is 0.031000 secs
Time taken to sort 5500 numbers is 0.032000 secs
Time taken to sort 6500 numbers is 0.031000 secs
```

Time taken to sort. 7500 numbers is 0.031000 secs

Time taken to sort 8500 numbers is 0.032000 secs

Time taken to sort 9500 numbers is 0.031000 secs

Time taken to sort 10500 numbers is 0.031000 secs

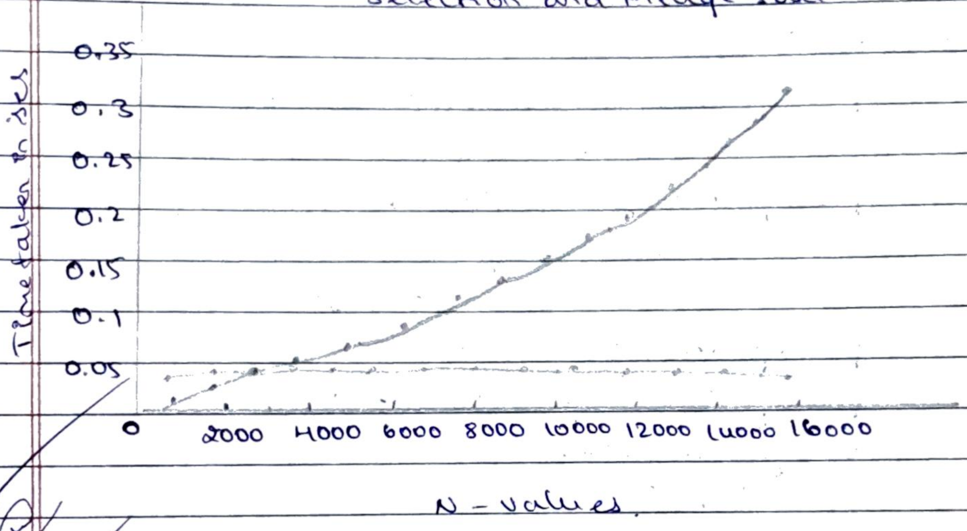
Time taken to sort 11500 numbers is 0.016000 secs

Time taken to sort 12500 numbers is 0.031000 secs

Time taken to sort 13500 Numbers is 0.031000 secs

Time taken to sort 14500 numbers is 0.031000 secs.

selection and merge sort



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