M. Roop Sagar ASSIGNMENT-6 APIGIDO10376

1) Take the elements from the user and bort-them in descending order and do the following. (if it is the in it is a. Using binary seach find the element and the location in the averag where the dement is asked for isentilled b. Ask the user to enter any two locations point the sum and product of value at those location, in the dorted array.

```
#include < Stdio. h>
int binary search (int arr [], int b, int x) = [i] [ [i]
4
  if (b>=a) {
    int mid = a+(b-a)/2;
     if (arr[mid] == x)
         return mid;
      if (arr[mid] >x)
         return binary search (arr, a, mid-1, x);
      return binary search (arr, mid+1, b, x);
     Entraction beretas to sulce of the Lat.
          a. Fired the position of element In
   3. Pristing own & multiplication of values
    int main()
                         entered residions 1;
                       Mark ( of the coins : 10)
      int num;
      print f (" Enter thesize of array: ");
       scanf ("il.d", & num);
                                         (90) risting
       int iij, a, val [Num], op, var, p1, p2, sum, proj
       for (a=0; a < num; a++)
    desiry priced some nor on all retiff a this
```

print f ("Enter value:"); scanf ("9. d', & val[a]);

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for (i=0; i < num; ++i)
 for (j=i+1; j< num;++j)
    if [val[i] < val[i])
a=val[i]; in any in the terms of the second
      val[i]= val[i]
       val(i]=a
  printf("Array in descending order:");
  for (i=0; i < num; i+t)
     printf("1.d", val[i]);
  printf ("\n" OPERATION _LIST ** \n");
  printf ("1. Find the value at entered position) n.
          a. Find the position of elementin.
          3. Printing sum & multiplication of values at
          entered positions");
  printf ("In Enter choice: In");
  Scanf ("%.d", 20p);
  switch (op)
  1000 1000 29, 19 (rev. 90, [ must be , 6, 1, 1, 4, ...
                     ( La : mars & to mi you
      case 1:
      printf ("Enter the position the obtain value:");
      scanf ("%d", &var);
                    (titles of the entrance)
```

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printf ("The value at 1.d position is 7.d", var, val(var));
        break:
       Case a :
       printf ("Enter element to find position:");
       scanf ("1.d", bran);
        int result = binary search (val, 0, num -1, var)
       (result ===1)? print f ["Element is not present in array
       :print+ ("Flement is present at index %d", result);
       return 0;
        case 3:
        printf ("In Enter two positions to find sum and product
                                 : [[++m]no of
            of values \n");
        scanf (the od; Ap, Ap2);
        Sum = valfet]+val[p2]; lo xolsi lidin'11 co;
        pro = vali[pi] val [pz]; to xabri latini 1:0 i
        printf ("SUM = %d In", sum);
        print f ("MULTIPLICATION = % d", pro);
         break;
                                    ([i] a e Xi])) ai
       z
                                    Sulkle Fill;
2) sort the array using Merge dort where elements are taken
from the user and find the product of kth eternent from
first and last where K is taken from the wier.
    #include <stalib.h>
                                   C(1)20(2)11
     # include < stdio.n >
      void merge lint arr[], intm, intr)
```

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the true of material with a contract of the property of the pr
                                     int ink
                                      int n1 = m-1+1;
                                       int na = r-m; add to be to de de de de
                                       1 create temp arrays 1
                int L[n], R[n2];
                                                                                                           to a si dicorred 3" 2 3 allor o
                                        / copy data to temp arrays LII and RII /
                                       for (i=0; i<n1; i++)
                                                       L(i)= arr [1+i];
and any for (j=D; j< n2; j+t) without and rawler " the
                                                          R[i] = arr[m+1+j];
                                          I merge the tamp arrays back into array 1
                                             izo; Il initial index of first i subarrayiller
                                            j=0; 11 initial index of second subarray.
                                             k = 1; 11 initial index of merged subarous
                                              while (ichi & & janz) on a mannument & sing
                                             4
                                                             if(L(iX=R(i])
                                                                         arr[k]= L[];
  Correct men of the same many beautiful and the same of the correct of the same of the correct of the same of the correct of th
                                      son the user and find the areduct of kith eferrers
                                                                   else in many ment in a many the box suit
                                                                        ď
                                                                           any[k]= R[j];
                                                                                 j++;
                                                                           K++
```

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1 copy the remaining element of LØTI if any 1
                            (++1, 05(25); 6=1) vol
while (icn 1)
                            of
  arr[k] . L[i];
  1++;
                                       amount to
  K++;
 1 copy the remaining elements of REI, it any 1
 while (j<n2)
 L
  arr[k]=R[i]i
   j++;
   K++;
  3
void merge sort (int arra, inti into)
ξ
                   miref ("Giren array 15 1 A); "
2
  !t(1<1)
                           mint array (ver, shi)
                          (1-cia,0, tov) traspis
   €
     int m= 1+(Y-1)/2;
     llsort first and second halves
     merge sort (arr, 1,m); grand at 14 1/2 10
merge sort (arramti, 1) and and manife
                       · it item! Due Julie
     merge (arr, 1; m, r);
                           Scanf P. at, &ky;
 Function to print an array 1 = >7 (0.07) ros
 void print Armay (int ACI, int size) in good
                              sqmot - 19
  of
```

```
int is you to I BI be transfer printing our part
for (i=o; i < size; i++)
   printf (">'d", A[i7);
                                      ([i] 1 - [y]ror
 printf ("In");
int main ()
 int six, vy till se staggest consumer we may
  print+ ("Enter array size:");
 scanf ("I.d", &siz);
  int val [siz];
 for (v=0; v<siz; v++)
  {
    printf ("Enter value:");
    scant (" % d" & val [v]), [] mo tri) tros aprom bion
  printf ("Given array is In");
  print Array (val, siz);
  mergesort (val, 0, siz-1)
 print f("\nSorted array is \n');
                            lead time though
  print Array (val, siz);
  int K, fil, Pl, P2, temp; (militro) drap sprom
  printf ("Enter the value of k to find the product of clements
   frint and last:");
                         merge (arr, 1, m, 1);
  scanf ("/ a", & k);
  P1 = P2=1;
 for [F=0, f<=k, F++)
     temp = val [4] = +ni, [] A +ni) yourne tring tien
     pi = temp:
```

'-for (1= Siz-1; 1>= K;1--) affections are great prover and done of the contract, temp-val (iliac and allier medical costs of the costs whose factor (02,01,01) purch indicate

printf ("Product of 14th element from first and last arre; see of code of all pipe person through the penson

percent along the distriction of the state of the formal

scendition are one of the mother than the 3) Discuss consertion sort and alection wort with examples

Insertion wort: - in hard multisepte residence in Inecrtion sort works by inserting the det of values in the existing sorted file. It constructs the sorted array by inserting à single element at a time. This process continues till whole array is sorted in same order. The primary concept behind vinsertion sort in each utem unto its appreciate place in the final list. The insertion sort method awres an effective amount of memory. The advantage of unsertion don't in it work until there are elements in the unsorted set. Easily implemented and very efficient when used with small Lets of data. It is faster than other aborting techniques

The best case complexing of unsertion wort is o(n) times he when the array is previously worted, required beyond what is nached to hold in original

Por example:

If we have the array as {40,10;50, 70, 30% and we apply unsertion don't to don't the array, then the resultant array after each internation will be as ITI The grown original arxay : {40,10,50, 70,30}

Avray after first interaction is: 10 ->40 ->50->70->30 Array after second interation is: 10 -> 40 -> 50-> 70->30 Averay after third unteration is: 10 -> 40 -> 50 -> 70->30 Array after fourth interaction is: 10 -> 20 -> 40 -> 50 -> 30 if there is inscribed west and abliction, get

*aelection sout :-

selection wort is another algorithm that is used for worting This acrting algorithm, iterates through the array and finds the amallest number in the array and awaps it with it first element if it is smaller than the first elements Next it goes on to the decond element and so on until on au elements are aorted and examples of selection sort:

consider the array: [10,5,2,17

The first element is 10. The next part we must find the smallest number from the remaining array. The smallest number from 52 and 1 is 1, do, we replace to by The new array is [1,5,2,10] Again this process is repeated The run time complexity of delection dort in O(n2). Advantages of aelection any is no additional atorage is required beyond what is needed to hold the original litt.

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4) hort the away using bubble dort where elaments are
taken from the user and display the elements
(i) in alternate order (ii) aum of elements un odd position
and product of elements in even position. (iii) elements
which are divisible by in where in is taken from the wis
                   of elements in even positions (n)
coder
                         orinte (" a Divisible by m Yn")
  #include <stdio-h>
   woid bubble sort (int ar(I, int n)" (1901) motors") 4 thing
                                     1 (90 & "b. P") 4 more
                                               (go) without
     temp = ar [i];
      ar[i] = ar[i+1);
      ar [j+1] = tempi
                                 for /1=0; 10 $12 (1+=2)
    3
    int main 1)
                                  (c=+i) xi2>i (o=i)>0
   9
    print+ ("Fnter size of required array:"); of ") + tring
    int siz, i;
     Scanf ("1. d", d Siz);
     int arr (siz)
                                  (1=0 ricsiz sit = 2)
     for li=o; icsiz ji++)
                                   in sum saidiff
     4
       print & ("Enter Element;")
       gean+ (11%), d! & arr[i]); (earlichesing illo
      bubble sort (arr, siz) [1] how would a strubon
       print + ("sorted array: \n)
      for (i=0;icsiz; i++) me to la min 14 forms
      print+ ("ol.d" arr[i]);
```

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ENJUFF (ultil) and order from ordered brown he was a
                     It holder you win in piece were
print+("In" "MENU" (n")
printf ("1. Display Element in alternate order \n');
print f ("2. Sum of element in odd position and product
      of elements in even positions (n");
printf (" 3. Divisible by m \n")
print + ("Enter choice:") min [ ) in this top status !
scan f (" 1-d" & OP);
switch (op)
                                   : (Hi] m - [1]m
 d
 case 1
                                       amor stulling
 for (i=0; i(&iz; i+=2)
 d
  case 1
 for (i=0; i < Siz ; i+=2)
 L
   prints ("% dit" arro[1]);
  3
 case 2:
  for (1=0 ; iLSiz si+=2)
  Ļ
   sum= sum+arr[i];
   3
   tor (i = 1; i < siz) i+=2) ((i) +00 6 (k 1) +01
    product: product arr[1]; (" pures betree") + pring
    ξ.
   Print f ("Sum: of d In" sum); + is is is is is is
                                 Tro "La" Atabro
```

```
printf ('product: % of In 'product);
                    ( by / triumals quarties and ration ) & timber
    print+ ("Enter value mi"); a filmer of told rot
     Scan-f ("b).d", &m);
print f ("Number's divisible by 7.d are:\n",m);
    for (1=0;1(siz;1++) ((mod ... domes & 1/1/19) +ms
          FOS = Lineary search (21,0) (en - 1) search item);
     if (arr[i] 10m==0)
                                               ( a > 200) (1)
    extend " carnot that the demant to din the arrapt.") 4 tilling
        printf("-/.d/t,"arr[i]);
ering of cestion of the in a cray is " h. h. search - hem, resil
     }
5) Write a recursive program to implement binary scarch?
  # include (stdio.h)
    int binary search (int a[], int low, int high, intx)(
    mt mid = (low+nigh)/2;
    if ( Low > high) return - 11
     if (a[mid]==x) return mid;
      if (a[mid]<2)
       return binary search (a, Kow, mid+1, x);
    Else
       return binary search (a, low, mid-1,x);
      3
    int main (void) (
      int alloot; den, pos, search-item;
```

```
printf (" 1. d", & Len); tout org" (1/ h. " : "bullows") Atrice.
  print + ("Enter the array element I n");
 for (int 1=0; iclen ; i+1) illien auto antist a min
                                     Kons ! Lam snor of
  scanf ("1:d", a [i]),
print-f (" Enter the element to search (n"))
 Scanf (117). d " & Search_item); (111) 12212 011) 101
  pos = binary search (a,0, len -1, search - item);
                                          Mary March 41
 ( 0> 209) 41
print + ("cannot find the element % din the array.
           in" search _ item );
 print of position of 1d in array is % d.in, search _ item, posti);
els e.
 returno;
 Z
By white a securaive program to implement himory drawing
                                     thought & studied #
       int binuons search lint all int low, int high, intx) f
                               mt mil = !low + righ) /2;
                                 if I low > high) return = 1:
                         thim muter (x==[bin]e) Hi
                                        FIGHINIO 1 633
             seturn throng search (a, Khop, and +1, x);
                                                      9913
            return binery search (a, low, with -1,x);
                                       1 (biox) where the
                     int affect; ten; rest search item;
```