Institute of Computer Technology

B. Tech Computer Science and Engineering

Subject: DS (2CSE302)

**PRACTICAL-24**

**AIM: - Implement searching methods on sorted elements.**

**1. Jigar is working in survey department of COVID-19. He has been received everyday number of cases from all the cities of Gujarat. Initially, He used to set data in ascending order, afterwards he wants to search number of cases from the data elements with relevant position. Kindly refer given scenario for searching and implement it in C:**

**Enter number of elements**

**8**

**Enter 8 elements:**

**34**

**22**

**56**

**13**

**89**

**5**

**67**

**45**

**List of searching methods:**

**1.Linear Search**

**2.Binary Search**

**3.Interpolation Search**

**4.Jump Search**

**5.Exit**

**Which searching method would you like to apply?**

**1**

**The elements of the array are - 5 13 22 34 45 56 67 89**

**Which value do you want search?**

**13**

**Element 13 found at position 2**

**List of searching methods:**

**1.Linear Search**

**2.Binary Search**

**3.Interpolation Search**

**4.Jump Search**

**5.Exit**

**Which searching method would you like to apply?**

**1**

**The elements of the array are - 5 13 22 34 45 56 67 89**

**Which value do you want search?**

**100**

**Element 100 not found**

**List of searching methods:**

**1.Linear Search**

**2.Binary Search**

**3.Interpolation Search**

**4.Jump Search**

**5.Exit**

**Which searching method would you like to apply?**

**2**

**The elements of the array are - 5 13 22 34 45 56 67 89**

**Which value do you want search?**

**34**

**Element 34 found at position 4**

**List of searching methods:**

**1.Linear Search**

**2.Binary Search**

**3.Interpolation Search**

**4.Jump Search**

**5.Exit**

**Which searching method would you like to apply?**

**2**

**The elements of the array are - 5 13 22 34 45 56 67 89**

**Which value do you want search?**

**35**

**Element 35 not found**

**List of searching methods:**

**1.Linear Search**

**2.Binary Search**

**3.Interpolation Search**

**4.Jump Search**

**5.Exit**

**Which searching method would you like to apply?**

**3**

**The elements of the array are - 5 13 22 34 45 56 67 89**

**Which value do you want search?**

**45**

**Element 45 found at position 5**

**List of searching methods:**

**1.Linear Search**

**2.Binary Search**

**3.Interpolation Search**

**4.Jump Search**

**5.Exit**

**Which searching method would you like to apply?**

**3**

**The elements of the array are - 5 13 22 34 45 56 67 89**

**Which value do you want search?**

**55**

**Element 55 not found**

**List of searching methods:**

**1.Linear Search**

**2.Binary Search**

**3.Interpolation Search**

**4.Jump Search**

**5.Exit**

**Which searching method would you like to apply?**

**4**

**The elements of the array are - 5 13 22 34 45 56 67 89**

**Which value do you want search?**

**67**

**Element 67 found at position 7**

**List of searching methods:**

**1.Linear Search**

**2.Binary Search**

**3.Interpolation Search**

**4.Jump Search**

**5.Exit**

**Which searching method would you like to apply?**

**4**

**The elements of the array are - 5 13 22 34 45 56 67 89**

**Which value do you want search?**

**88**

**Element 88 not found**

**List of searching methods:**

**1.Linear Search**

**2.Binary Search**

**3.Interpolation Search**

**4.Jump Search**

**5.Exit**

**Which searching method would you like to apply?**

**6**

**Enter valid choice!**

***SOLUTION***

#include <stdio.h>

#include <stdlib.h>

#include <math.h>

void Sort(int array[], int m)

{

int i, j, k, temp;

for (i = 0; i < m - 1; i++)

{

for (j = 0; j < m - i - 1; j++)

{

if (array[j] > array[j + 1])

{

temp = array[j];

array[j] = array[j + 1];

array[j + 1] = temp;

}

}

}

}

void LinearSearch(int array[], int m, int v)

{

int i, pos = -1;

for (i = 0; i < m; i++)

{

if (array[i] == v)

{

pos = i;

printf("\nElement %d fount at position %d", v, pos + 1);

break;

}

}

if (pos == -1)

{

printf("\nElement %d not found", v);

}

}

void BinarySearch(int array[], int low, int high, int v)

{

int beg = low, end = high, mid, pos = -1;

while (beg <= end)

{

mid = (beg + end) / 2;

if (array[mid] == v)

{

pos = mid;

printf("\nElement %d fount at position %d", v, pos + 1);

break;

}

else if (array[mid] > v)

{

end = mid - 1;

}

else

{

beg = mid + 1;

}

}

if (pos == -1)

{

printf("\nElement %d not found", v);

}

}

void InterpolationSearch(int array[], int low, int high, int v)

{

int beg = low, end = high, mid, pos = -1;

while (beg <= end)

{

mid = beg + (end - beg) \* ((v - array[beg]) / (array[end] - array[beg]));

if (array[mid] == v)

{

pos = mid;

printf("\nElement %d fount at position %d", v, pos + 1);

break;

}

else if (array[mid] > v)

{

end = mid - 1;

}

else

{

beg = mid + 1;

}

}

if (pos == -1)

{

printf("\nElement %d not found", v);

}

}

void JumpSearch(int array[], int low, int high, int v, int m)

{

int step = sqrt(m), i = 0, beg = low, end = high, pos = -1;

while (i < step)

{

if (v < array[step])

{

end = step - 1;

}

else

{

low = step + 1;

}

i = i + 1;

}

i = beg;

while (i <= end)

{

if (array[i] == v)

{

pos = i;

printf("\nElement %d fount at position %d", v, pos + 1);

break;

}

i++;

}

if (pos == -1)

{

printf("\nElement %d not found", v);

}

}

int main()

{

int n, i;

printf("\nEnter number of elements: ");

scanf("%d", &n);

printf("\nEnter %d elements: ", n);

int yash[n];

for (i = 0; i < n; i++)

{

scanf("%d", &yash[i]);

}

Sort(yash, n);

int choice, value;

do

{

printf("\n");

printf("\nList of searchig methods:\n1. Linear Search \n2. Binary Search \n3. Interpolation Search \n4. Jump Search \n5. Exit\n");

printf("\nWhich searching method would you like to apply? ");

scanf("%d", &choice);

switch (choice)

{

case 1:

printf("\nThe elements of the array are: ");

for (i = 0; i < n; i++)

{

printf("%d ", yash[i]);

}

printf("\n");

printf("\nWhich value do you want search? ");

scanf("%d", &value);

LinearSearch(yash, n, value);

break;

case 2:

printf("\nThe elements of the array are: ");

for (i = 0; i < n; i++)

{

printf("%d ", yash[i]);

}

printf("\n");

printf("\nWhich value do you want search? ");

scanf("%d", &value);

BinarySearch(yash, 0, n - 1, value);

break;

case 3:

printf("\nThe elements of the array are: ");

for (i = 0; i < n; i++)

{

printf("%d ", yash[i]);

}

printf("\n");

printf("\nWhich value do you want search? ");

scanf("%d", &value);

InterpolationSearch(yash, 0, n - 1, value);

break;

case 4:

printf("\nThe elements of the array are: ");

for (i = 0; i < n; i++)

{

printf("%d ", yash[i]);

}

printf("\n");

printf("\nWhich value do you want search? ");

scanf("%d", &value);

JumpSearch(yash, 0, n - 1, value, n);

break;

case 5:

there:

printf("\nExiting system.....\n");

exit(0);

break;

default:

here:

printf("Enter valid choice\n");

break;

}

} while (choice != 5);

printf("\n");

return 0;

}

***OUTPUT***









