Jaypee University of Engineering and Technology, Guna

[LAB ACTIVITY 3]

DATA STRUCTURES

(18B11CI311)

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1. WAP to insert new element at given index number in the array.

Solution:

```
#include<iostream>
using namespace std;
int main()
{
    int size,pos,ele;
    cout<<"Enter the Size of the array\n";
    cin>>size;
    int arr[size];
    cout<<"Enter the Elements in the Array\n";
    for(int i=0;i<size;i++)
    {
        cin>>arr[i];
    }
    cout<<"Enter the element you want to enter and its position : \n";
    cin>>ele>>pos;
    size=size+1;
    for(int i=size-1;i>pos;i--)
    arr[i]=arr[i-1];
    arr[pos]=ele;
    for(int i=0;i<size;i++)
    {
        cout<<arr[i];
    }
}
```

Output:

```
Windows PowerShell
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PS C:\Users\hp\Desktop\lab files DS> cd "c:\Users\hp\Desktop\lab files DS\lab3\" ; if ($?) { g++ que1.cpp -o que1 } ; if ($?) { .\que1 }
Enter the Size of the array
5
Enter the Elements in the Array
1 2 3 4 6
Enter the element you want to enter and its position :
5
4
1 2 3 4 5 6
PS C:\Users\hp\Desktop\lab files DS\lab3>
```

2. WAP to implement the linear search. Use function concept, if element is found then return index number of element otherwise return -1;

Solution:

```cpp
#include <iostream>
using namespace std;
int search(int arr[], int size, int key)
{
    for (int i = 0; i < size; i++)
    {
        if (arr[i] == key)
            return 1;
    }
    return -1;
}
int main()
{
    int size, key, res;
    cout << "Enter the Size of the array\n";
    cin >> size;
    int arr[size];
    cout << "Enter the Elements in the Array\n";
    for (int i = 0; i < size; i++)
    {
        cin >> arr[i];
    }
    cout << "Enter the element you want to search : \n";
    cin >> key;
    res = search(arr, size, key);
    if (res == 1)
        cout << "Element Found\n";
    else
        cout << "Element Not Found\n";
    return 0;
}
```

Output:

```
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PS C:\Users\hp\Desktop\lab files DS> cd "c:\Users\hp\Desktop\lab files DS\lab3\" ; if ($?) { g++ que2.cpp -o que2 } ; if ($?) { .\que2 }
Enter the Size of the array
5
Enter the Elements in the Array
1 2 3 4 5
Enter the element you want to search :
4
Element Found
PS C:\Users\hp\Desktop\lab files DS\lab3>
```

3. WAP to delete an element from an array, use search algorithm to find the index number of given number; if element to be deleted is not found then print “Error: element not found”.

Solution:

```cpp
#include <iostream>
using namespace std;
```

```cpp
int delete_element(int array[], int n, int element)
{
    int flag;
    for (int i = 0; i < n; i++)
    {
        if (element == array[i])
        {
            flag = 1;
            array[i] = array[i + 1];
        }
    }
    if (flag == 1)
        return 1;
    else
        return -1;
}

int main()
{
    int n, element, res;
    cout << "Enter the number of elements" << endl;
    cin >> n;
    int array[n];
    cout << "Enter the elements of the array" << endl;
    for (int i = 0; i < n; i++)
    {
        cin >> array[i];
    }
    cout << "Enter the element to be deleted" << endl;
    cin >> element;
    res = delete_element(array, n, element);
    if (res == -1)
        cout << "Element not found!";
    else
    {
        for (int i = 0; i < n - 1; i++)
        {
            cout << array[i] << " ";
        }
    }
    return 0;
}
```

Output:

```
Windows PowerShell
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PS C:\Users\hp\Desktop\lab files DS> cd "c:\Users\hp\Desktop\lab files DS\lab3\" ; if ($?) { g++ que3.cpp -o que3 } ; if ($?) { .\que3 }
Enter the number of elements
5
Enter the elements of the array
1 2 3 4 5
Enter the element to be deleted
4
1 2 3 5
PS C:\Users\hp\Desktop\lab files DS\lab3>
```

4. WAP for checking whether there are any duplicated elements in the array or not?

Solution:

```cpp
#include <iostream>
using namespace std;

int duplicatecheck(int array[], int n)
{
    int flag = 0;
    for (int i = 0; i < n; i++)
    {
        for (int j = i + 1; j < n; j++)
        {
            if (array[i] == array[j])
            {
                flag++;
                break;
            }
        }
    }
    if (flag == 0)
    {
        cout << "No duplicate element";
    }
    else
        cout << "Yes duplicate element present";
}

int main()
{
    int Size;
    cout << "Enter the size of array" << endl;
    cin >> Size;
    int array[Size];
    cout << "Enter the elements of the array" << endl;
    for (int i = 0; i < Size; i++)
    {
        cin >> array[i];
    }
    duplicatecheck(array, Size);
    return 0;
}
```

Output:

```
Windows PowerShell
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PS C:\Users\hp\Desktop\lab files DS> cd "c:\Users\hp\Desktop\lab files DS\lab3\" ; if ($?) { g++ que4.cpp -o que4 } ; if ($?) { .\que4 }
Enter the size of array
6
Enter the elements of the array
1 2 3 4 5 2
Yes duplicate element present
PS C:\Users\hp\Desktop\lab files DS\lab3>
```

5. Mary is a kindergarten teacher. She has given a task to the children after teaching them a list of words. The task is to find the unknown words (other than the words they already know) from the given text. Write a function which accepts the text and the known list of words and prints a set of unknown words found. If there are no unknown words found then prints “Successful”. [Hint use find_word() function of Lab 1]

Sample Input Expected Output

Text: "the sun rises in the east"

Vocabulary: ["sun","in","east","doctor","day"]

{“rises”, “the”}

Solution:

Output:

6. [This is a Q. 10 of Lab 2, Solve it if you have not done earlier] Consider that you are given with a data base of employee records (at least 5). Each employee record having following information –

Emp_id(integer) Emp_name(string) Emp_city

Assume that Emp_id is unique. Write a function for taking data base and put it in your header file. Use this function by including your own header file for following questions.

{Use the structure for creating data base}

a. Write a function to find out the employee record from this data base on the base of Emp_id.

b. Write a function to sort the employee records on the base of Emp_id.

c. Write a function to sort (alphabetically) the array of characters.

d. Write a function to count the number of employees in data base.

e. Write a function to add 5 more records in data base.

Solution:

```c
#include "my_headerfile.h"

#include <stdio.h>
#include <conio.h>
#include <string.h>
#define MAX 100
int count_emp(struct emp DB[])
{
    int count = 0;
    int i = 0;
    while (i < MAX)
    {
        if (DB[i].emp_id == -1)
            break;
        i++;
        count++;
    }
    return count;
}
void sort_by_id(struct emp DB[])
{
    int i, j;
    struct emp temp;
    int num = count_emp(DB); // call count_emp

    for (i = 0; i < num - 1; i++)
    {
        for (j = i + 1; j < num; j++)
        {
            if (DB[i].emp_id > DB[j].emp_id)
            {
                temp = DB[i];
                DB[i] = DB[j];
                DB[j] = temp;
            }
        }
    }
}
void sort_alpha(struct emp DB[])
{
    int i, j;
    struct emp temp;
    int num = count_emp(DB); // call count_emp
    for (i = 0; i < num - 1; i++)
    {
        for (j = i + 1; j < num; j++)
        {
            if (strcmp(DB[i].emp_name, DB[j].emp_name) > 0)
            {
                temp = DB[i];
                DB[i] = DB[j];
                DB[j] = temp;
            }
        }
```

```
    }
}
int main()
{
    struct emp DB[MAX]; //array struct
    int n, i;
    printf("Enter size: ");
    scanf("%d", &n);
    for (i = 0; i < MAX; i++)
    {
        DB[i].emp_id = -1; // set all emp_id by -1
    }
    Input_DB(DB, n);
    printf("\nBefore sorting: ");
    for (i = 0; i < n; i++)
    {
        //printf("Enter data of employee %d",i);
        printf("\n%d  %s  %s", DB[i].emp_id, DB[i].emp_name, DB[i].emp_city);
    }
    sort_alpha(DB);
    sort_by_id(DB);
    printf("\nAfter sorting: ");
    for (i = 0; i < n; i++)
    {
        //printf("Enter data of employee %d",i);
        printf("\n%d  %s  %s", DB[i].emp_id, DB[i].emp_name, DB[i].emp_city);
    }
    getch();
    return 0;
}
```

My_headerfile.h

```
#include <stdio.h>
#include <string.h>
struct emp
{
    int emp_id;
    char emp_name[100], emp_city[100];
};
void Input_DB(struct emp DB[], int n)
{
    int i;
    for (i = 0; i < n; i++)
    {
        printf("Enter data of employee %d ", i + 1);
        printf("\nEnter ID");
        scanf("%d", &DB[i].emp_id);
        while ((getchar()) != '\n')
            ; // for clearing the input buffer
        printf("\nEnter name");
        scanf("%[^\n]s", DB[i].emp_name);
        while ((getchar()) != '\n')
            ; // for clearing the input buffer
```

```
        printf("\nEnter City");
        scanf("%[^\n]s", DB[i].emp_city);
    }
    //return DB;
}
int find_word(char *s1, char *s2)
{
    int n = 0;
    int m = 0;
    //printf("\nSearching %s word in string  %s\n",s1,s2);
    int times = 0;        // store the  frequency of the word
    int len = strlen(s2); // contains the length of search string
    while (s1[n] != '\0')
    {

        if (s1[n] == s2[m])
        { // if first character of search string matches keep on searching

            while (s1[n] == s2[m] && s1[n] != '\0')
            {
                n++;
                m++;
            }
            // if the sequence of characters matching with the length of searched string
            if (m == len && (s1[n] == ' ' || s1[n] == '\0'))
            {           //we find our search string.
                times++; //count the frequency of word
            }
        }
        else
        { // if first character of search string DOES NOT match
            while (s1[n] != ' ')
            { // Skip to next word
                n++;
                if (s1[n] == '\0')
                    break;
            }
        }

        n++;
        m = 0; // reset the counter to start from first character of the search string.
    }
    int flag = 0;
    if (times > 0)
    {
        //printf("\n'%s' appears %d time(s)\n", s2, times);
        flag = 1;
    }
    else
    {
        //printf("\n'%s' does not appear in the sentence.\n", s2);
    }
    return flag;
}
```

Output:

```
Windows PowerShell
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PS C:\Users\hp\Desktop\lab files DS> cd "c:\Users\hp\Desktop\lab files DS\lab3\" ; if ($?) { g++ que6.cpp -o que6 } ; if ($?) { .\que6 }
Enter size: 2
Enter data of employee 1
Enter ID201

Enter namePalash

Enter CityGuna
Enter data of employee 2
Enter ID202

Enter nameRahul

Enter CityBhopal

Before sorting:
201  Palash  Guna
202  Rahul  Bhopal
After sorting:
201  Palash  Guna
202  Rahul  Bhopal
```