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[CSS352]

Assignment 1

1. Write a C program to insert a new element into an array at a specified position.
   Modify your program to continue inserting elements into the array as per user's choice.
   Perform necessary checks for array overflow as required.

2. Write a C program to delete a specified element from an array.
   Modify your program to continue deleting elements from the array as per user's choice.
   Perform necessary checks for array underflow as required.

3. Write a C program to traverse an array of n elements to find whether a specified element say, ITEM, is present in the array or not. If the element ITEM is found, then report the position of ITEM within the array, else report "ITEM not found".

Code

```c
#include <stdio.h>
#include <stdbool.h>
#include <windef.h>
#define MAXSIZE 100

/*
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*/

int arr[MAXSIZE];
int size;


void insert_at(int index, int value){

  if(index >= MAXSIZE || index < 0){
    printf("Array overflow!\n");
    return;
  }

  if(!arr[index]){
    arr[index] = value;
    size = max(index, size) + 1;
  } else {

    for (int i = MAXSIZE - 1; i > index; i--){
      arr[i] = arr[i - 1];
    }

    arr[index] = value;
    size = max(index, size) + 1;
  }
}


```

```c
void delete_from(int index){

  if(index < 0 || index >= size){
    printf("Invalid index. Index not in range.\nEnter in range (0 : %d)\n", size-1);
    return;
  }

  if(!arr[index]){
    printf("Index %d is already empty\n", index);
  } else {

    int deleted_value = arr[index];

    for (int i = index; i < size; i++){
      arr[i] = arr[i + 1];
    }
    arr[size - 1] = 0;
    size--;
    printf("%d at index %d has been deleted\n", deleted_value, index);
  }
}


int search(int key){

  for (int i = 0; i < size; i++){
    if (arr[i] == key){
      return i;
    }
  }

  printf("%d is not found in the array.\n", key);
  return -1;
}


void display_array(){

  for (int i = 0; i < size; i++){
    printf("%d ", arr[i]);
  }
  printf("\n---\n");
}


int main () {

  //Original Array
  printf("Enter no. of elements: ");
  scanf("%d", &size);

  printf("Enter the array below:\n");
  for (int i = 0; i < size; i++){
    scanf("%d", &arr[i]);
  }

```

```
  //Driver Code
  bool want_to_exit = 0;
  while (!want_to_exit){
    int userchoice;
    printf("\n1: Insert new element\n2: Delete an index\n3: Search for a value\n0: Quit\n");
    printf("Choose option: ");
    scanf("%d", &userchoice);

    int index, value, key;

    switch (userchoice) {
      case 1:
        printf("\nEnter #index #value: ");
        scanf("%d %d", &index, &value);
        insert_at(index, value);
        printf("Array: "); display_array();
        break;

      case 2:
        printf("\nEnter #index to be deleted: ");
        scanf("%d", &index);
        delete_from(index);
        printf("Array: "); display_array();
        break;

      case 3:
        printf("\nEnter #value to search: ");
        scanf("%d", &key);
        int position = search(key);
        printf("%d is at position %d\n", key, position);
        break;

      default:
        want_to_exit = 1;
        break;
    }
  }

  return 0;
}

```

Output

Answer 1 – Insertion of Elements

```
PS D:\Classes\Third Semester\DSA Laboratory Assignments> cd "d:\Classes\Th
ird Semester\DSA Laboratory Assignments\Arrays\" ; if ($?) { gcc arrays_ma
nipulation.c -o arrays_manipulation } ; if ($?) { .\arrays_manipulation }
Enter no. of elements: 6
Enter the array below:
12 3 50 69 -5 21

1: Insert new element
2: Delete an index
3: Search for a value
0: Quit
Choose option: 1

Enter #index #value: 1 -10
Array: 12 -10 3 50 69 -5 21
---

1: Insert new element
2: Delete an index
3: Search for a value
0: Quit
Choose option: 1

Enter #index #value: -2 29
Array overflow!
Array: 12 -10 3 50 69 -5 21
---

1: Insert new element
2: Delete an index
3: Search for a value
0: Quit
Choose option: 1

Enter #index #value: 102 49
Array overflow!
Array: 12 -10 3 50 69 -5 21
---

1: Insert new element
2: Delete an index
3: Search for a value
0: Quit
Choose option: 0
```

Answer 2 – Deletion of index

```
PS D:\Classes\Third Semester\DSA Laboratory Assignments> cd "d:\Classes\Th
ird Semester\DSA Laboratory Assignments\Arrays\" ; if ($?) { gcc arrays_ma
nipulation.c -o arrays_manipulation } ; if ($?) { .\arrays_manipulation }
Enter no. of elements: 6
Enter the array below:
12 3 50 69 -5 21

1: Insert new element
2: Delete an index
3: Search for a value
0: Quit
Choose option: 2

Enter #index to be deleted: 5
21 at index 5 has been deleted
Array: 12 3 50 69 -5
---

1: Insert new element
2: Delete an index
3: Search for a value
0: Quit
Choose option: 2

Enter #index to be deleted: 8
Invalid index. Index not in range.
Enter in range (0 : 4)
Array: 12 3 50 69 -5
---

1: Insert new element
2: Delete an index
3: Search for a value
0: Quit
Choose option: 0
```

Answer 3 – Searching for a Value

```
PS D:\Classes\Third Semester\DSA Laboratory Assignments> cd "d:\Classes\Th
ird Semester\DSA Laboratory Assignments\Arrays\" ; if ($?) { gcc arrays_ma
nipulation.c -o arrays_manipulation } ; if ($?) { .\arrays_manipulation }
Enter no. of elements: 6
Enter the array below:
12 3 50 69 -5 21

1: Insert new element
2: Delete an index
3: Search for a value
0: Quit
Choose option: 3

Enter #value to search: 50
50 is at position 2

1: Insert new element
2: Delete an index
3: Search for a value
0: Quit
Choose option: 3

Enter #value to search: 6
6 is not found in the array.
6 is at position -1

1: Insert new element
2: Delete an index
3: Search for a value
0: Quit
Choose option: 0
```

Private Link for compiler code:

https://drive.google.com/file/d/1xDJ_nAVrh6npIla0pzMmQaFfnx7CNyoj/view?usp=sharing