

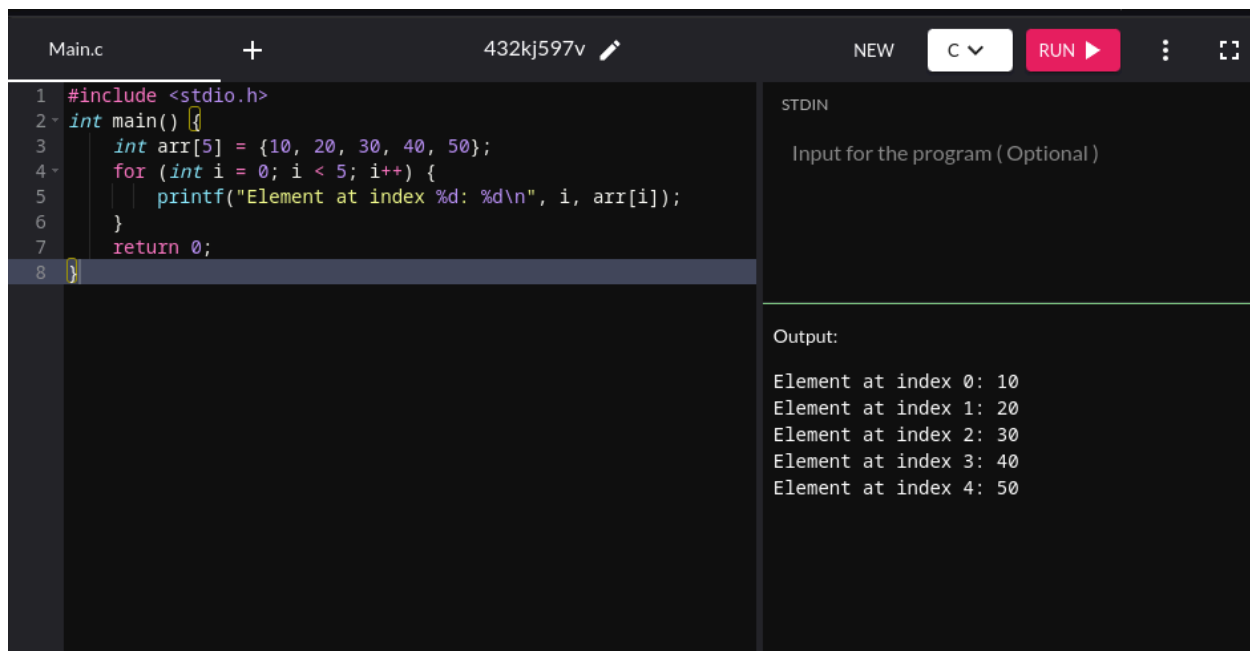
Cavalier Institute - <https://cavalierinstitutions.com>

Date	Dec 13 2024	Assignment	3
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Topic : C Programming Arrays and Functions

Practice these questions

- Write a program to initialize and print the elements of an integer array.



```
1 #include <stdio.h>
2 int main() {
3     int arr[5] = {10, 20, 30, 40, 50};
4     for (int i = 0; i < 5; i++) {
5         printf("Element at index %d: %d\n", i, arr[i]);
6     }
7     return 0;
8 }
```

STDIN

Input for the program (Optional)

Output:

```
Element at index 0: 10
Element at index 1: 20
Element at index 2: 30
Element at index 3: 40
Element at index 4: 50
```

- Write a program to find the largest number in an array.

The screenshot shows a C program in an IDE. The code defines an array `arr` with values {10, 45, 32, 67, 23} and finds the maximum value. The output is "Largest number is: 67".

```
1 #include <stdio.h>
2 int main() {
3     int arr[5] = {10, 45, 32, 67, 23};
4     int max = arr[0];
5     for (int i = 1; i < 5; i++) {
6         if (arr[i] > max) {
7             max = arr[i];
8         }
9     }
10    printf("Largest number is: %d\n", max);
11    return 0;
12 }
```

Output: Largest number is: 67

- Write a program to find the sum of all elements in an array.

The screenshot shows a C program in an IDE. The code defines an array `arr` with values {10, 20, 30, 40, 50} and calculates their sum. The output is "Sum of elements: 150".

```
1 #include <stdio.h>
2 int main() {
3     int arr[5] = {10, 20, 30, 40, 50};
4     int sum = 0;
5     for (int i = 0; i < 5; i++) {
6         sum += arr[i];
7     }
8     printf("Sum of elements: %d\n", sum);
9     return 0;
10 }
11
```

Output: Sum of elements: 150

```
#include <stdio.h>
int main() {
    int arr[5] = {10, 20, 30, 40, 50};
    int sum = 0;
    for (int i = 0; i < 5; i++) {
        sum += arr[i];
    }
    printf("Sum of elements: %d\n", sum);
}
```


```
    return 0;
}
```

- **Write a C program to perform the following tasks:**

1. Initialize an empty array that can hold a maximum of 10 integers.
2. Prompt the user to input the number of elements they want to add to the array (ensure it does not exceed the maximum size of 10).
3. Use a loop to accept the user inputs and store them in the array.
4. After all elements are entered, display the elements of the array using another loop.

Constraints:

- The maximum number of elements that can be added to the array is 10.
- Input validation is required to ensure the user does not enter more than 10 elements.

main.c	Run	Output
<pre>1 #include <stdio.h> 2 3 int main() { 4 int arr[10]; // Declare an array with a size of 10 5 int n, i; 6 7 // Ask the user for the number of elements to add 8 printf("Enter the number of elements (max 10): "); 9 scanf("%d", &n); 10 11 // Ensure the number of elements does not exceed the array size 12 if (n > 10) { 13 printf("You can only add up to 10 elements .\n"); 14 return 1; 15 } 16 17 // Use a loop to populate the array 18 printf("Enter %d elements:\n", n); 19 for (i = 0; i < n; i++) { 20 printf("Element %d: ", i + 1); 21 scanf("%d", &arr[i]); 22 } 23 24 // Print the array elements 25 printf("The elements in the array are:\n"); 26 for (i = 0; i < n; i++) { 27 printf("%d ", arr[i]); 28 } 29 30 return 0;</pre>		<pre>Enter the number of elements (max 10): 5 Enter 5 elements: Element 1: 2 Element 2: 3 Element 3: 1 Element 4: 34 Element 5: 54 The elements in the array are: 2 3 1 34 54 === Code Execution Successful ===</pre>

- Create an array of all even numbers from 10 to 100 and calculate their sum:

The screenshot shows a C code editor with a file named 'Main.c'. The code is as follows:

```

1  #include <stdio.h>
2
3  int main() {
4      int even_numbers[46]; // Array to store even numbers from 10 to 100
5      int sum = 0;
6      int index = 0;
7
8      // Fill the array with even numbers and calculate the sum
9      for (int i = 10; i <= 100; i += 2) {
10         even_numbers[index] = i; // Add the even number to the array
11         sum += i;                // Add the number to the sum
12         index++;
13     }
14
15     // Print the array of even numbers
16     printf("Array of even numbers: ");
17     for (int i = 0; i < index; i++) {
18         printf("%d ", even_numbers[i]);
19     }
20     printf("\n");
21
22     // Print the sum of even numbers
23     printf("Sum of even numbers: %d\n", sum);
24
25     return 0;
26 }
27

```

On the right side of the editor, there is a 'STDIN' section for input and an 'Output' section. The output shows:

```

Array of even numbers: 10 12 14 16 18 20 22
Sum of even numbers: 2530

```

Program

```
#include <stdio.h>
```

```
int main() {
    int even_numbers[46]; // Array to store even numbers from 10 to 100
    int sum = 0;
    int index = 0;
```

```
    // Fill the array with even numbers and calculate the sum
    for (int i = 10; i <= 100; i += 2) {
        even_numbers[index] = i; // Add the even number to the array
        sum += i;                // Add the number to the sum
        index++;
    }
```

```
    // Print the array of even numbers
    printf("Array of even numbers: ");
    for (int i = 0; i < index; i++) {
        printf("%d ", even_numbers[i]);
    }
```

```

printf("\n");

// Print the sum of even numbers
printf("Sum of even numbers: %d\n", sum);

return 0;
}

```

Output:

Array of even numbers: 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54
 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100
 Sum of even numbers: 2530

- Write a program to reverse the elements of an array.

```

#include <stdio.h>
int main() {
    int arr[5] = {1, 2, 3, 4, 5};
    printf("Original Array: ");
    for (int i = 0; i < 5; i++) {
        printf("%d ", arr[i]);
    }
    printf("\nReversed Array: ");
    for (int i = 4; i >= 0; i--) {
        printf("%d ", arr[i]);
    }
    return 0;
}

```

The screenshot shows a code editor with a C program. The code defines an array of 5 integers {1, 2, 3, 4, 5} and prints it. Then it prints the reversed array by iterating from the last element to the first. The output on the right shows the original array as '1 2 3 4 5' and the reversed array as '5 4 3 2 1'.

```

Main.c 432kj597v
1 #include <stdio.h>
2 int main() {
3     int arr[5] = {1, 2, 3, 4, 5};
4     printf("Original Array: ");
5     for (int i = 0; i < 5; i++) {
6         printf("%d ", arr[i]);
7     }
8     printf("\nReversed Array: ");
9     for (int i = 4; i >= 0; i--) {
10        printf("%d ", arr[i]);
11    }
12    return 0;
13 }
14
STDIN
Input for the program ( Optional )

Output:
Original Array: 1 2 3 4 5
Reversed Array: 5 4 3 2 1

```

Questions to try :

Arrays

1. What is an array, and how is it different from a regular variable?
2. How do you declare and initialize an array in your preferred programming language? Provide an example.
3. Write a program to find the largest number in a given array.
4. Write a program to calculate the sum of all elements in an array.
5. How do you access the first and last elements of an array?
6. What happens if you try to access an element outside the bounds of an array?
7. Write a program to reverse the elements of an array.
8. How can you check if an array is empty?
9. Write a program to count the number of even and odd numbers in an array.
10. Explain the difference between a one-dimensional and a two-dimensional array. Provide examples.

Functions

1. What is a function, and why is it used in programming?
2. Write a function to calculate the square of a number.
3. How do you pass arguments to a function? Explain with an example.
4. What is the difference between passing arguments by value and by reference?
5. Write a function to check if a given number is prime.
6. What is a return statement, and how is it used in functions?
7. Can a function return multiple values? If yes, how? Provide an example.
8. What is the difference between a function declaration and a function call?
9. Write a function to find the factorial of a given number.
10. How can you call a function inside another function? Provide an example.

END