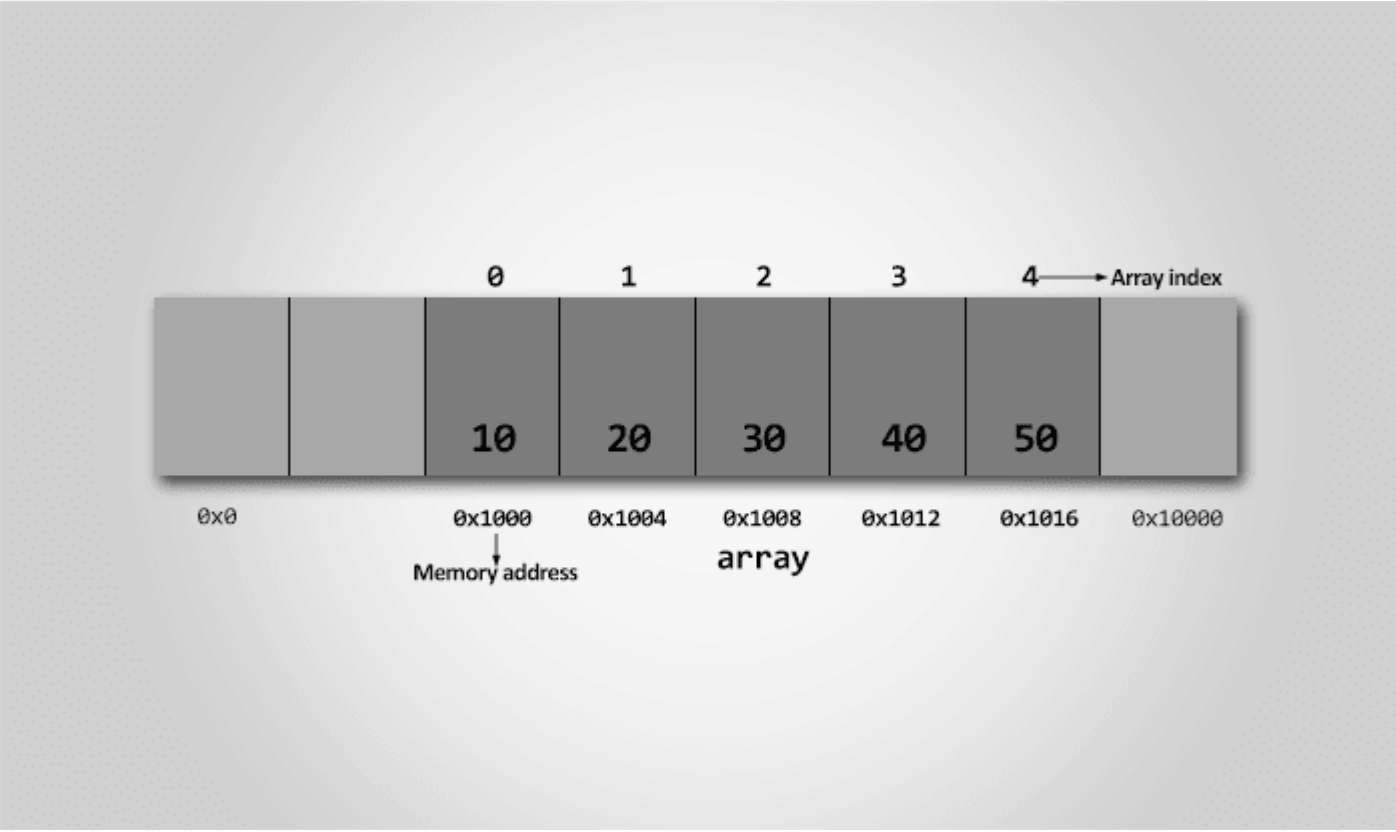
How to access array using pointer

Array elements in memory are stored sequentially. For example, consider the given array and its memory representation

```
int arr[] = {10, 20, 30, 40, 50};
```



Pointer and array memory representation

If you have a pointer say `ptr` pointing at `arr[0]`. Then you can easily apply pointer arithmetic to get reference of next array element. You can either use `(ptr + 1)` or `ptr++` to point to `arr[1]`.

Program to input and print array elements using pointer

```
/**
 * C program to input and print array elements using pointers
 */

#include <stdio.h>

#define MAX_SIZE 100 // Maximum array size

int main()
{
    int arr[MAX_SIZE];
    int N, i;
    int * ptr = arr;    // Pointer to arr[0]

    printf("Enter size of array: ");
    scanf("%d", &N);

    printf("Enter elements in array:\n");
    for (i = 0; i < N; i++)
    {
        scanf("%d", ptr);

        // Move pointer to next array element
        ptr++;
    }

    // Make sure that pointer again points back to first array element
    ptr = arr;

    printf("Array elements: ");
    for (i = 0; i < N; i++)
    {
        // Print value pointed by the pointer
        printf("%d, ", *ptr);

        // Move pointer to next array element
        ptr++;
    }

    return 0;
}
```

another way to write the above program. I must say the better way to deal with arrays using pointer is, instead of incrementing pointer use pointer addition.

Program to input and print array using pointers - best approach

```
/**
 * C program to input and print array elements using pointers
 */

#include <stdio.h>

#define MAX_SIZE 100 // Maximum array size

int main()
{
    int arr[MAX_SIZE];
    int N, i;
    int * ptr = arr;    // Pointer to arr[0]

    printf("Enter size of array: ");
    scanf("%d", &N);

    printf("Enter elements in array:\n");
    for (i = 0; i < N; i++)
    {
        // (ptr + i) is equivalent to &arr[i]
        scanf("%d", (ptr + i));
    }

    printf("Array elements: ");
    for (i = 0; i < N; i++)
    {
        // *(ptr + i) is equivalent to arr[i]
        printf("%d, ", *(ptr + i));
    }

    return 0;
}
```

Note: `(ptr + i)` *is equivalent to* `&ptr[i]`*, similarly* `*(ptr + i)` *is equivalent to* `ptr[i]`*. Also you can use* `(i + ptr)`*,* `i[ptr]` *all means the same.*

Program to input and print array using pointer in array notation

```
/**
 * C program to input and print array elements using pointer in array notation
 */

#include <stdio.h>

#define MAX_SIZE 100 // Maximum array size

int main()
{
    int arr[MAX_SIZE];
    int N, i;
    int * ptr = arr;    // Pointer to arr[0]

    printf("Enter size of array: ");
    scanf("%d", &N);

    printf("Enter elements in array:\n");
    for (i = 0; i < N; i++)
    {
        // &ptr[i] is equivalent to &arr[i]
        scanf("%d", &ptr[i]);
```