# DEPARTMENT OF COMPUTER SCIENCE CUI, VEHARI CAMPUS Assignments no. 01



# Subject:

Data Structure & Algorithm-Lab <u>Submitted to</u>:

Respected Mam Yasmeen Jana

**Submitted by:** 

Sadaf Fatima (SP22-BCS-B24-100-B)

#### 1. Basic Pointer Declaration and Use:

```
#include <iostream>
using namespace std;
int main() {
    int x = 10;
    int* ptr = &x;
    cout << "Value of x: " << x << endl;
    cout << "Value using pointer: " << *ptr << endl;
    return 0;
}

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```

### 2. Pointer Arithmetic:

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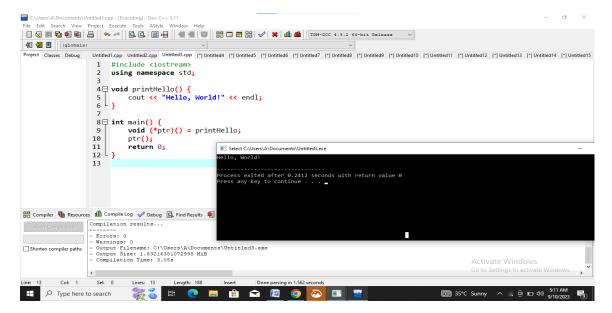
#include <iostream>

```
using namespace std;
int main() {
    int arr[] = {1, 2, 3, 4, 5};
    int* ptr = arr;
    cout << "Array elements using pointers: ";
    for (int i = 0; i < 5; i++) {
        cout << *ptr << " ";
        ptr++;
    }</pre>
```

```
cout << endl;
   return 0;
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2 using namespace std;
                       34 | int main() {
5     int arr[] = {1, 2, 3, 4, 5};
6     int* ptr = arr;
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}
                                 cout << "Array elements using pointers: ";
for (int i = 0; i < 5; i++) {
   cout << *ptr << " ";
   ptr++;
}</pre>
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                                 return 0;
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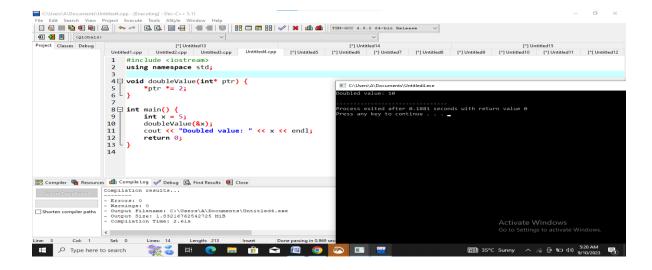
#### 3. Pointer to Function:

```
#include <iostream>
using namespace std;
void printHello() {
   cout << "Hello, World!" << endl;
}
int main() {
   void (*ptr)() = printHello;
   ptr();
   return 0;
}</pre>
```



# 4. Passing Pointers to Functions:

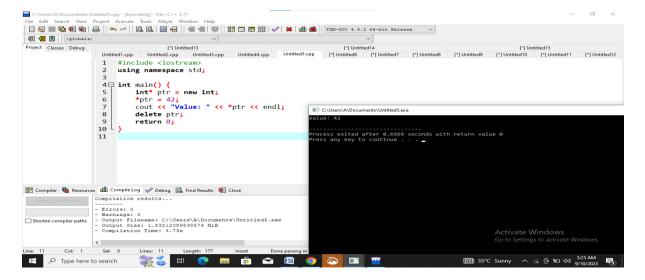
```
#include <iostream>
using namespace std;
void doubleValue(int* ptr) {
   *ptr *= 2;
}
int main() {
   int x = 5;
   doubleValue(&x);
   cout << "Doubled value: " << x << endl;
   return 0;
}</pre>
```



# **5. Dynamic Memory Allocation:**

```
#include <iostream>
```

```
using namespace std;
int main() {
  int* ptr = new int;
  *ptr = 42;
  cout << "Value: " << *ptr << endl;
  delete ptr;
  return 0;
}</pre>
```



## 6. Pointer to Array:

```
#include <iostream>
using namespace std;
int main() {
    int arr[] = {1, 2, 3, 4, 5};
    int (*ptr)[5] = &arr;
    cout << "First element: " << (*ptr)[0] << endl;
    return 0;
}

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#### 7. Pointer to Pointer:

```
#include <iostream>
using namespace std;
int main() {
  int x = 42;
  int* ptr1 = &x;
  int** ptr2 = &ptr1;
  cout << "Value of x: " << **ptr2 << endl;
  return 0;</pre>
```

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```

```
8. Pointers with Strings:
#include <iostream>
using namespace std;
int main() {
   const char* message = "Hello, Pointers!";
   cout << message << endl;
  return 0;
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    const char* message = "Hello, Pointers!";
    cout << message << endl;
    return 0;
}</pre>
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```

#### 9. Pointers to Structs:

```
#include <iostream>
using namespace std;
struct Point {
  int x;
  int y;
};
int main() {
   Point p = \{10, 20\};
   Point* ptr = &p;
   cout << "Coordinates: (" << ptr->x << ", " << ptr->y << ")" << endl;
   return 0;
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                     4⊟ struct Point {
                     5
                             int x;
                     6
                             int y;
                    9 int main() {
                             Point p = {10, 20};
Point* ptr = &p;
                    10
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                             cout << "Coordinates: (" << ptr->x << ", " << ptr->y << ")" << endl;</pre>
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```

#### 10. Null Pointers:

#include <iostream>

```
using namespace std;
int main() {
       int* ptr = NULL; // Creating a null pointer
       if (ptr == NULL) {
                cout << "Pointer is null." << endl;</pre>
       } else {
                cout << "Pointer is not null." << endl;</pre>
        }
       return 0;
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                                                                        if (ptr == NULL) {
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```

#### 11. Pointers to Constants:

```
#include <iostream>
using namespace std;
int main() {
  const int x = 42;
  const int* ptr = &x;
```

```
cout << "Value: " << *ptr << endl;
      return 0;
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                                                             2 using namespace std;
                                                            const int* ptr = &x;
cout << "Value: " << *ptr << endl;</pre>
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#### 12. Constant Pointers:

```
#include <iostream>
```

```
using namespace std;
int main() {
  int x = 42;
  int* const ptr = &x;
  *ptr = 24;
  cout << "Value: " << *ptr << endl;
  return 0;
}</pre>
```

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#### 13. Pointer to Constant Data:

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```
#include <iostream>
using namespace std;
int main() {
  int x = 42;
   const int* ptr = &x;
  // *ptr = 24; // Error: Cannot modify constant data
   cout << "Value: " << *ptr << endl;
   return 0;
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                     2 using namespace std;
                     4 int main() {
                              int x = 42;
                     6
                               const int* ptr = &x;
                              // *ptr = 24; // Error: Cannot modify constant data
cout << "Value: " << *ptr << endl;
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# 14. Array of Pointers:

```
#include <iostream>
using namespace std;
int main() {
       int x = 10, y = 20, z = 30;
       int* arr[3] = {&x, &y, &z};
        cout << "Values: " << *arr[0] << " " << *arr[1] << " " << *arr[2] << endl;
       return 0;
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                                                      1 #include <iostream>
                                                      2 using namespace std;
                                                      4 int main() {
                                                                             int x = 10, y = 20, z = 30;
int* arr[3] = {&x, &y, &z};
cout << "Values: " << *arr[0] << " " << *arr[1] << " " << *arr[2] << endl;
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```

#### 15. Pointers to Functions:

```
using namespace std;
int add(int a, int b) {
  return a + b;
}
int main() {
```

#include <iostream>

```
int (*ptr)(int, int) = add;
cout << "Sum: " << ptr(5, 7) << endl;
return 0;</pre>
```

