# DEPARTMENT OF COMPUTER SCIENCE CUI, VEHARI CAMPUS

# Assignments no. 01

Subject:

**Computer Network-Lab**

**Submitted to:**

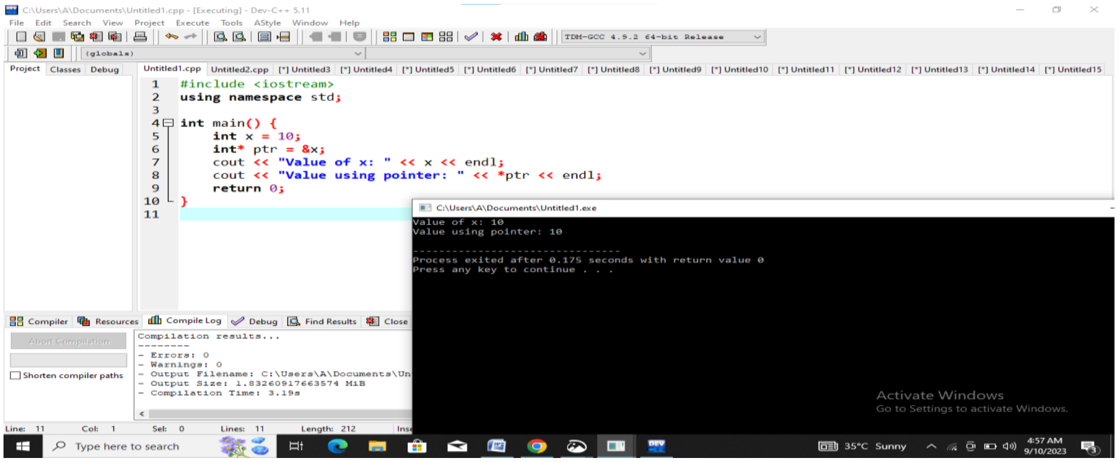
**Respected Prof. Dewan Qaseem**

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;

}
```


C:\Users\A\Documents\Untitled1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
Untitled1.cpp Untitled2.cpp [*] Untitled3 [*] Untitled4 [*] Untitled5 [*] Untitled6 [*] Untitled7 [*] Untitled8 [*] Untitled9 [*] Untitled10 [*] Untitled11 [*] Untitled12 [*] Untitled13 [*] Untitled14 [*] Untitled15
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
□ Shorten compiler paths
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C:\Users\A\Documents\Untitled1.exe
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4:57 AM
9/10/2023

```
#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;
}
```

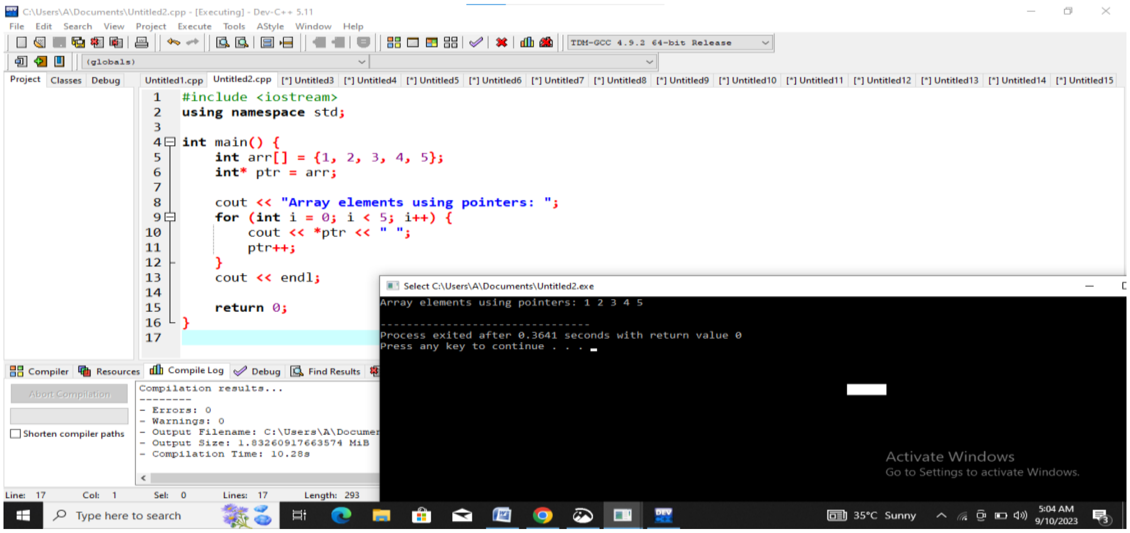
```
Value of x: 10
Value using pointer: 10

--------------------------------
Process exited after 0.175 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documents\Un
- Output Size: 1.83260917663574 MiB
- Compilation Time: 3.19s
```

## 2. Pointer Arithmetic:

```
#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++;

  }
```

```
    cout << endl;
    return 0;
}
```


C:\Users\A\Documents\Untitled2.cpp - [Executing] - Dev-C++ 5.11
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TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
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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++;
    }
    cout << endl;

    return 0;
}
```

Select C:\Users\A\Documents\Untitled2.exe

```
Array elements using pointers: 1 2 3 4 5

--------------------------------
Process exited after 0.3641 seconds with return value 0
Press any key to continue . . .
```

Compiler Resources Compile Log Debug Find Results
Abort Compilation
□ Shorten compiler paths

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documer
- Output Size: 1.83260917663574 MiB
- Compilation Time: 10.28s
```

Line: 17 Col: 1 Sel: 0 Lines: 17 Length: 293
Activate Windows
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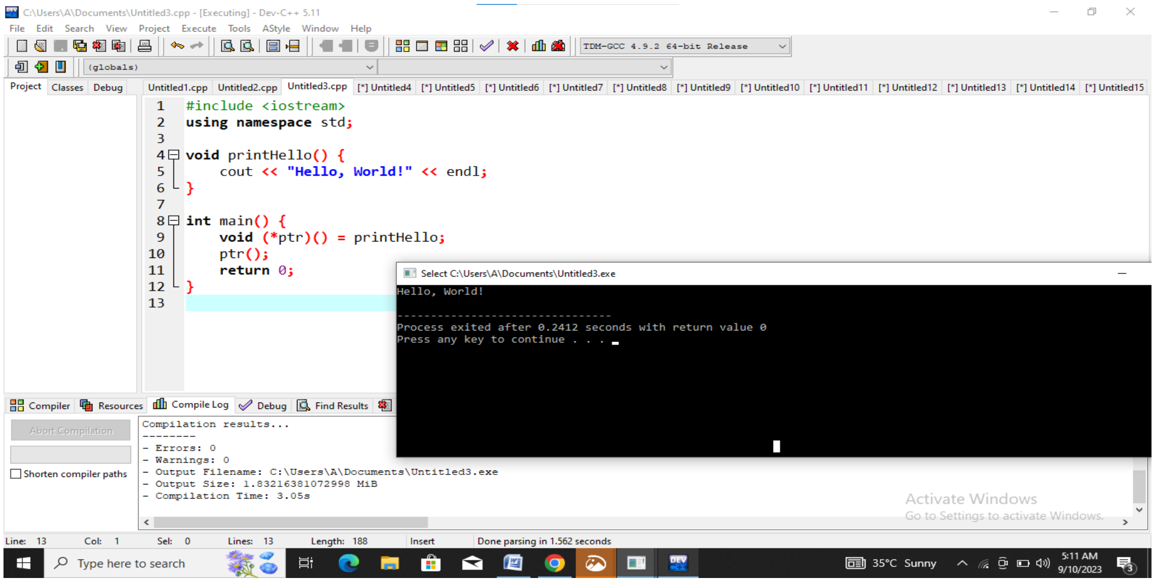
5:04 AM
9/10/2023

## 3. Pointer to Function:

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


C:\Users\A\Documents\Untitled3.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
Untitled1.cpp Untitled2.cpp Untitled3.cpp [*] Untitled4 [*] Untitled5 [*] Untitled6 [*] Untitled7 [*] Untitled8 [*] Untitled9 [*] Untitled10 [*] Untitled11 [*] Untitled12 [*] Untitled13 [*] Untitled14 [*] Untitled15
Select C:\Users\A\Documents\Untitled3.exe
Compiler Resources Compile Log Debug Find Results
Abort Compilation
Shorten compiler paths
Activate Windows
Go to Settings to activate Windows.
Line: 13 Col: 1 Sel: 0 Lines: 13 Length: 188 Insert Done parsing in 1.562 seconds
Type here to search
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5:11 AM
9/10/2023

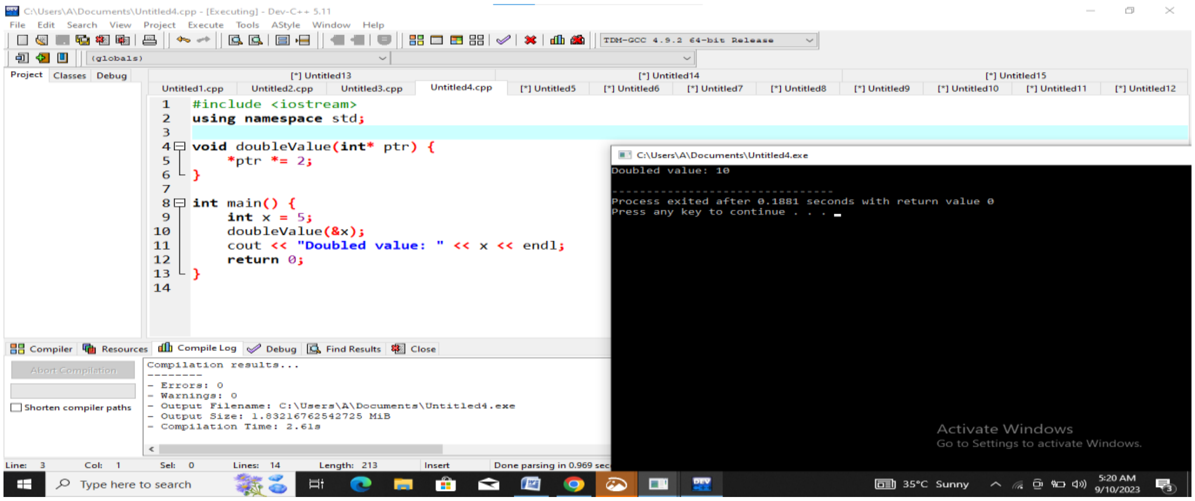
```
#include <iostream>
using namespace std;

void printHello() {
    cout << "Hello, World!" << endl;
}

int main() {
    void (*ptr)() = printHello;
    ptr();
    return 0;
}
```

```
Hello, World!

--------------------------------
Process exited after 0.2412 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documents\Untitled3.exe
- Output Size: 1.83216381072998 MiB
- Compilation Time: 3.05s
```

## 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;

}
```



C:\Users\A\Documents\Untitled4.cpp - [Executing] - Dev-C++ 5.11

```cpp
#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;
}
```

C:\Users\A\Documents\Untitled4.exe

```
Doubled value: 10

--------------------------------
Process exited after 0.1881 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documents\Untitled4.exe
- Output Size: 1.83216762542725 MiB
- Compilation Time: 2.61s
```

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Project Classes Debug
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Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Line: 3 Col: 1 Sel: 0 Lines: 14 Length: 213 Insert Done parsing in 0.969 sec
Activate Windows
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5:20 AM
9/10/2023

## 5. Dynamic Memory Allocation:

#include <iostream>

using namespace std;

int main() {

   int* ptr = new int;

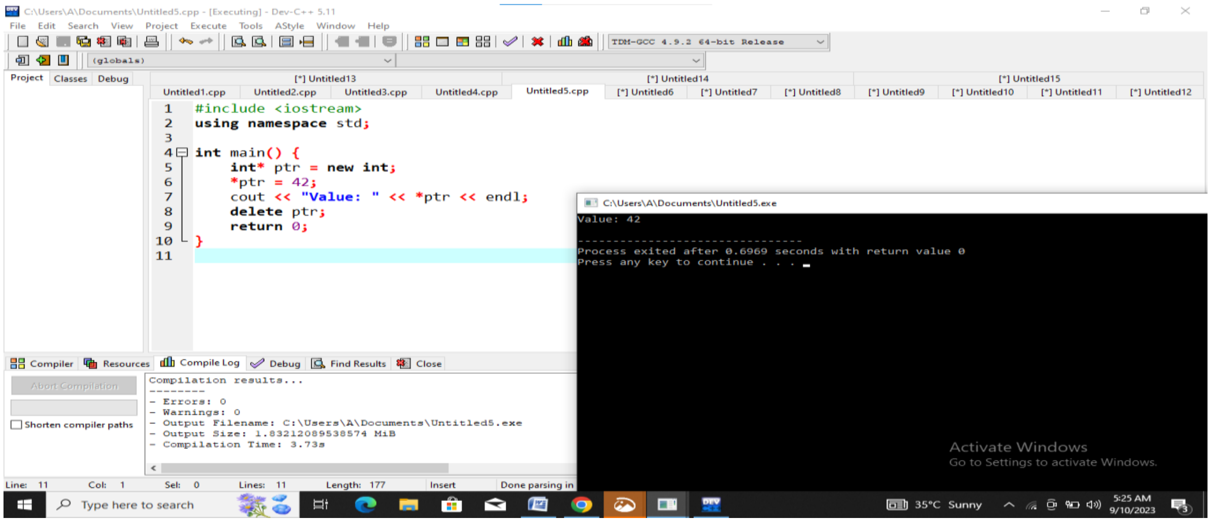
   *ptr = 42;

   cout << "Value: " << *ptr << endl;

   delete ptr;

   return 0;

}



C:\Users\A\Documents\Untitled5.cpp - [Executing] - Dev-C++ 5.11

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

int main() {
    int* ptr = new int;
    *ptr = 42;
    cout << "Value: " << *ptr << endl;
    delete ptr;
    return 0;
}
```

C:\Users\A\Documents\Untitled5.exe

```
Value: 42

--------------------------------
Process exited after 0.6969 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documents\Untitled5.exe
- Output Size: 1.83212089538574 MiB
- Compilation Time: 3.73s
```

File Edit Search View Project Execute Tools AStyle Window Help
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(globals)
Project Classes Debug
Untitled1.cpp Untitled2.cpp Untitled3.cpp Untitled4.cpp Untitled5.cpp [*] Untitled6 [*] Untitled7 [*] Untitled8 [*] Untitled9 [*] Untitled10 [*] Untitled11 [*] Untitled12 [*] Untitled13 [*] Untitled14 [*] Untitled15
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Line: 11 Col: 1 Sel: 0 Lines: 11 Length: 177 Insert Done parsing in
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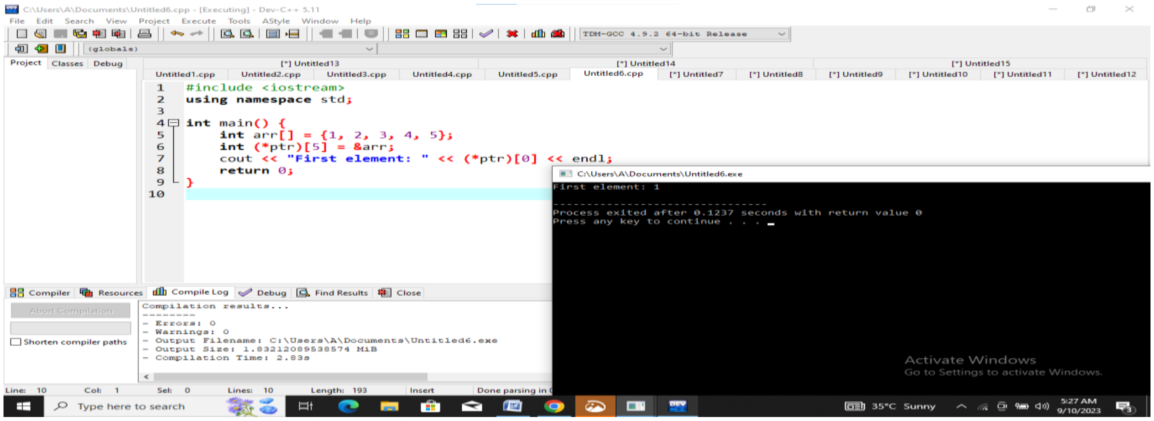
## 6. Pointer to Array:

```
#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;

}
```



C:\Users\A\Documents\Untitled6.cpp - [Executing] - Dev-C++ 5.11

```
#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;
}
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documents\Untitled6.exe
- Output Size: 1.83212089538574 MiB
- Compilation Time: 2.83s
```

C:\Users\A\Documents\Untitled6.exe

```
First element: 1

--------------------------------
Process exited after 0.1237 seconds with return value 0
Press any key to continue . . .
```

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(globals)
Project Classes Debug
Untitled1.cpp Untitled2.cpp Untitled3.cpp Untitled4.cpp Untitled5.cpp Untitled6.cpp [*] Untitled7 [*] Untitled8 [*] Untitled9 [*] Untitled10 [*] Untitled11 [*] Untitled12 [*] Untitled13 [*] Untitled14 [*] Untitled15
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Line: 10 Col: 1 Sel: 0 Lines: 10 Length: 193 Insert Done parsing in
Activate Windows
Go to Settings to activate Windows.
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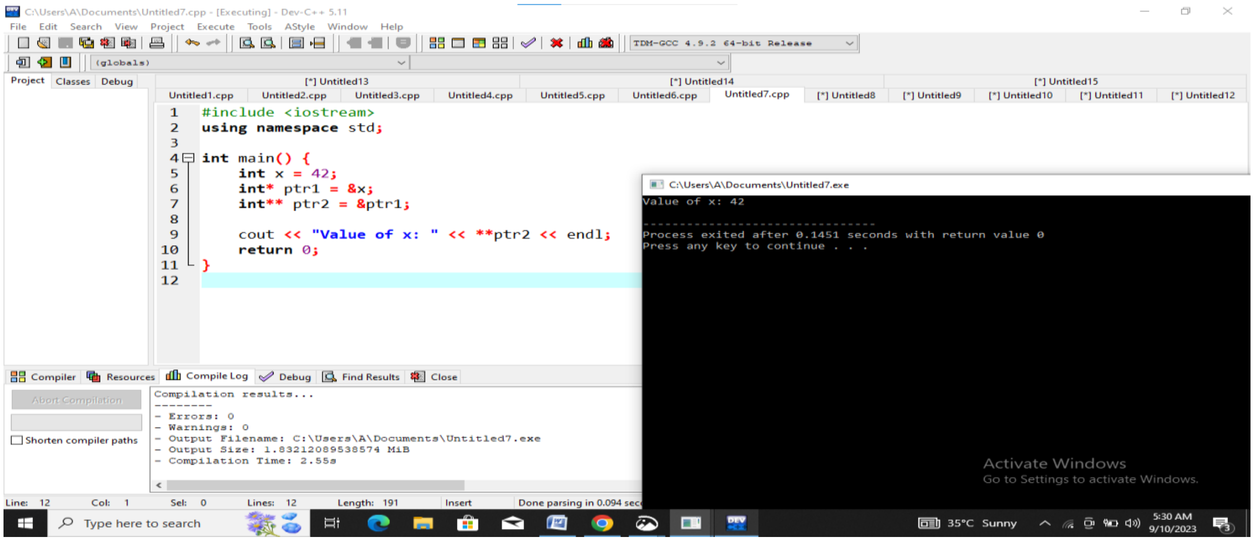
5:27 AM
9/10/2023

## 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;
```

}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Project Classes Debug
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Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Line: 12 Col: 1 Sel: 0 Lines: 12 Length: 191 Insert Done parsing in 0.094 sec
C:\Users\A\Documents\Untitled7.exe
Activate Windows
Go to Settings to activate Windows.
Type here to search
35°C Sunny
5:30 AM
9/10/2023

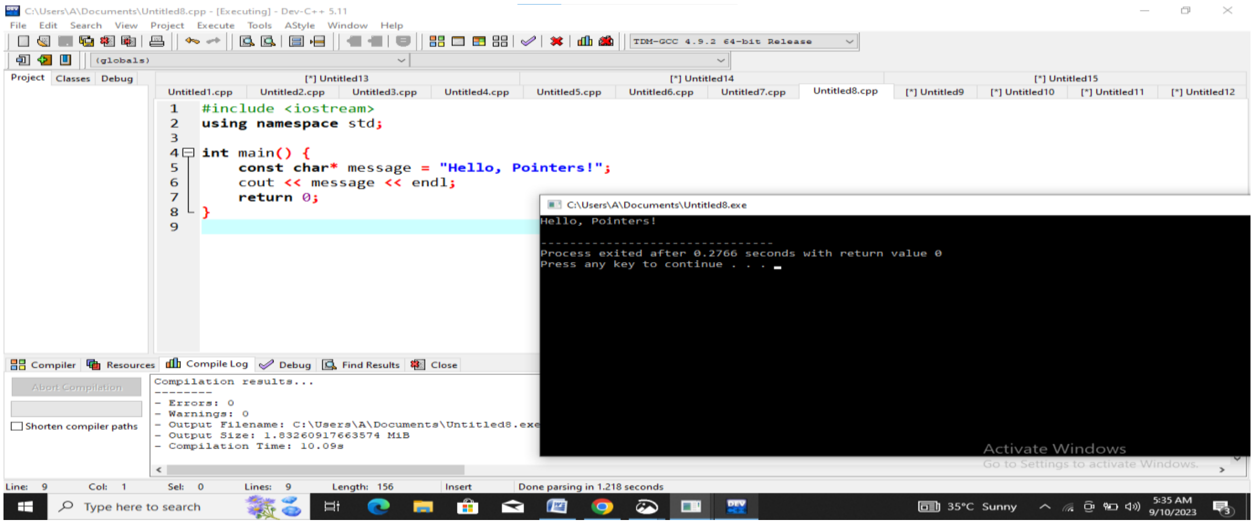
```
#include <iostream>
using namespace std;

int main() {
    int x = 42;
    int* ptr1 = &x;
    int** ptr2 = &ptr1;

    cout << "Value of x: " << **ptr2 << endl;
    return 0;
}
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documents\Untitled7.exe
- Output Size: 1.83212089538574 MiB
- Compilation Time: 2.55s
```

```
Value of x: 42

--------------------------------
Process exited after 0.1451 seconds with return value 0
Press any key to continue . . .
```

## 8. Pointers with Strings:

```
#include <iostream>

using namespace std;

int main() {

    const char* message = "Hello, Pointers!";

    cout << message << endl;

   return 0;

}
```


C:\Users\A\Documents\Untitled8.cpp - [Executing] - Dev-C++ 5.11
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(globals)
Project Classes Debug
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Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Line: 9 Col: 1 Sel: 0 Lines: 9 Length: 156 Insert Done parsing in 1.218 seconds
C:\Users\A\Documents\Untitled8.exe
Activate Windows
Go to Settings to activate Windows.
Type here to search
35°C Sunny
5:35 AM
9/10/2023

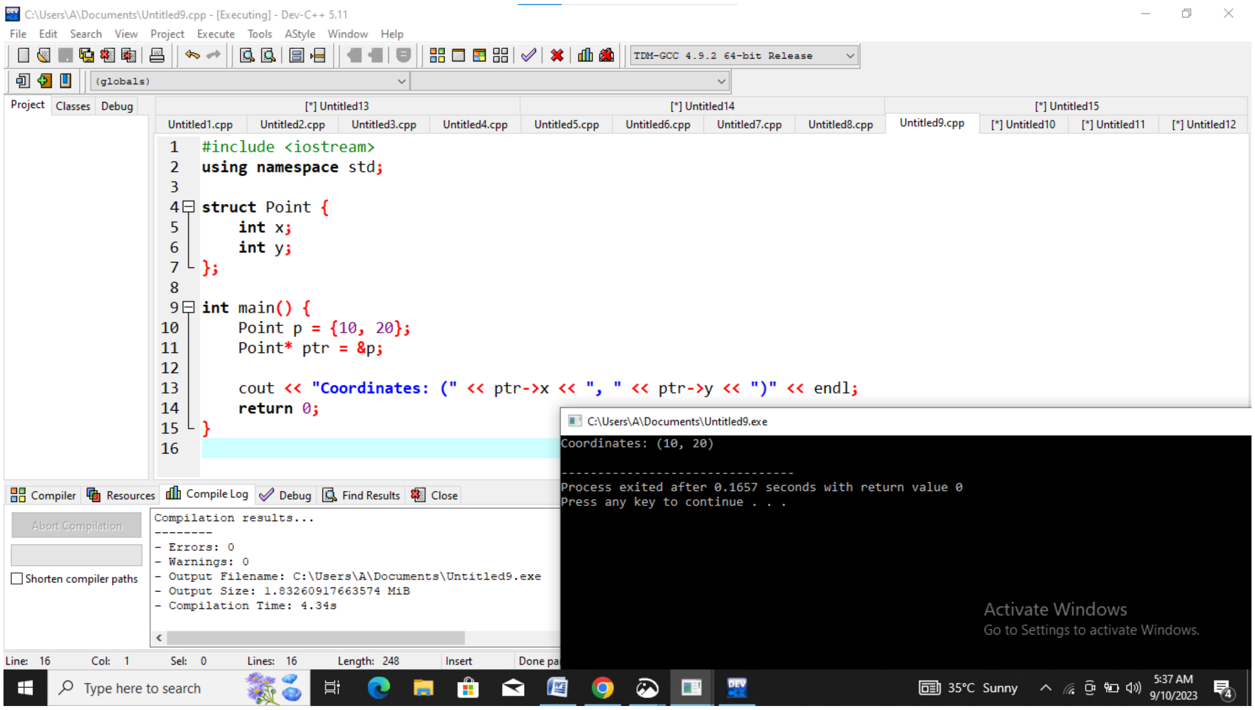
```
#include <iostream>
using namespace std;

int main() {
    const char* message = "Hello, Pointers!";
    cout << message << endl;
    return 0;
}
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documents\Untitled8.exe
- Output Size: 1.83260917663574 MiB
- Compilation Time: 10.09s
```

```
Hello, Pointers!

--------------------------------
Process exited after 0.2766 seconds with return value 0
Press any key to continue . . .
```

## 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;

}
```



C:\Users\A\Documents\Untitled9.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
[*] Untitled13
[*] Untitled14
[*] Untitled15
Untitled1.cpp Untitled2.cpp Untitled3.cpp Untitled4.cpp Untitled5.cpp Untitled6.cpp Untitled7.cpp Untitled8.cpp Untitled9.cpp [*] Untitled10 [*] Untitled11 [*] Untitled12
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
C:\Users\A\Documents\Untitled9.exe
Activate Windows
Go to Settings to activate Windows.
Type here to search
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5:37 AM
9/10/2023

```
#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;
}
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documents\Untitled9.exe
- Output Size: 1.83260917663574 MiB
- Compilation Time: 4.34s
```

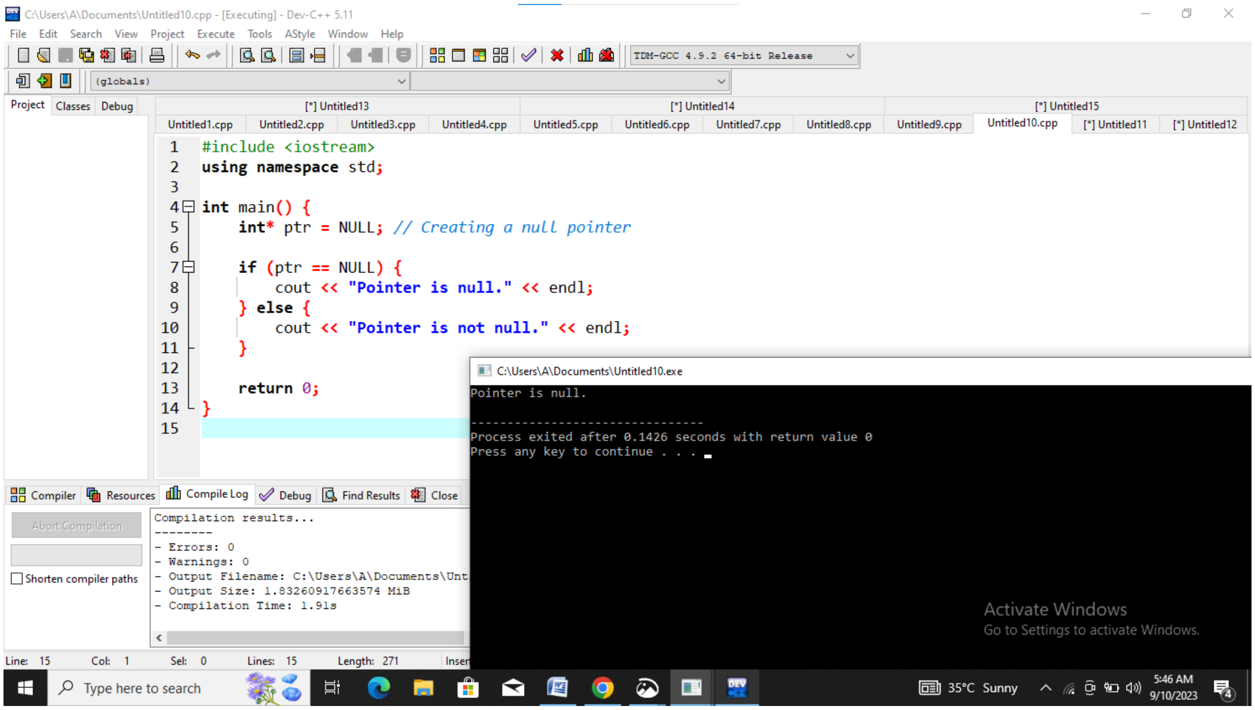
```
Line: 16    Col: 1    Sel: 0    Lines: 16    Length: 248    Insert    Done pa
```

```
Coordinates: (10, 20)

--------------------------------
Process exited after 0.1657 seconds with return value 0
Press any key to continue . . .
```

## 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;

    } else {

        cout << "Pointer is not null." << endl;

    }

    return 0;

}
```



C:\Users\A\Documents\Untitled10.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
[*] Untitled13 [*] Untitled14 [*] Untitled15
Untitled1.cpp Untitled2.cpp Untitled3.cpp Untitled4.cpp Untitled5.cpp Untitled6.cpp Untitled7.cpp Untitled8.cpp Untitled9.cpp Untitled10.cpp [*] Untitled11 [*] Untitled12
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Line: 15 Col: 1 Sel: 0 Lines: 15 Length: 271 Inser
C:\Users\A\Documents\Untitled10.exe
Activate Windows
Go to Settings to activate Windows.
Type here to search
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5:46 AM
9/10/2023

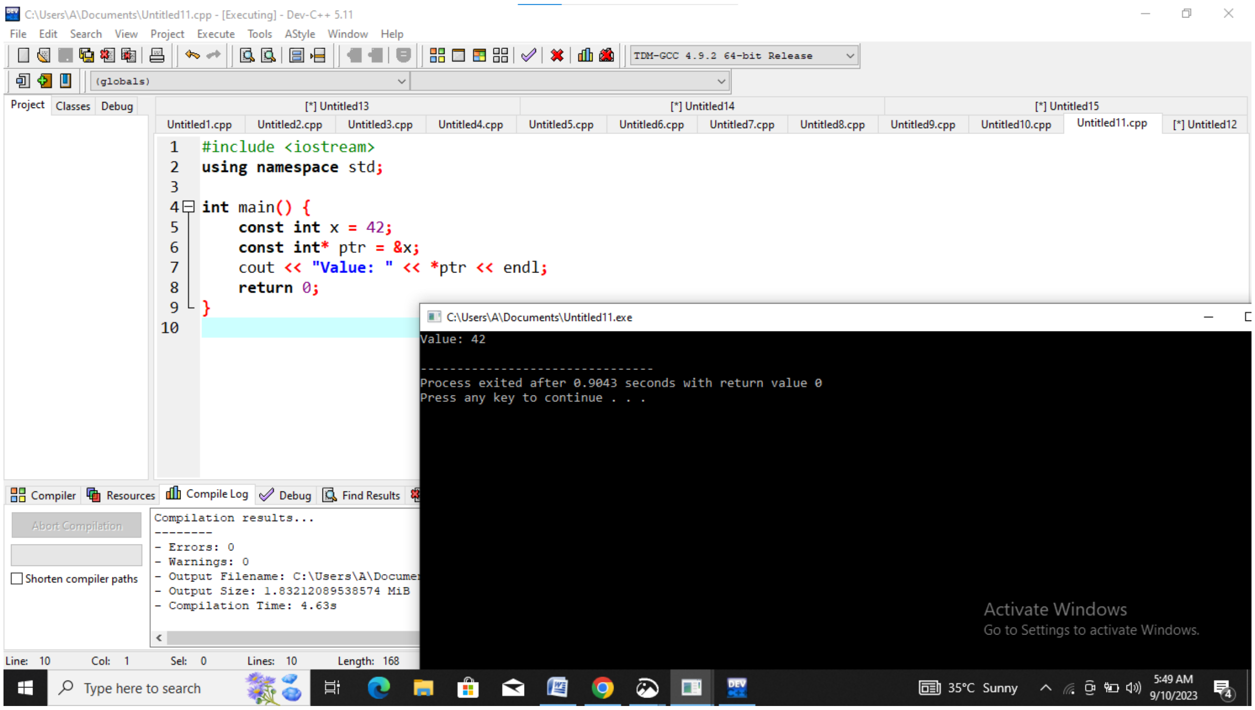
```
#include <iostream>
using namespace std;

int main() {
    int* ptr = NULL; // Creating a null pointer

    if (ptr == NULL) {
        cout << "Pointer is null." << endl;
    } else {
        cout << "Pointer is not null." << endl;
    }

    return 0;
}
```

```
Pointer is null.

--------------------------------
Process exited after 0.1426 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documents\Unt
- Output Size: 1.83260917663574 MiB
- Compilation Time: 1.91s
```

## 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;

}
```



C:\Users\A\Documents\Untitled11.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
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Untitled1.cpp Untitled2.cpp Untitled3.cpp Untitled4.cpp Untitled5.cpp Untitled6.cpp Untitled7.cpp Untitled8.cpp Untitled9.cpp Untitled10.cpp Untitled11.cpp [*] Untitled12
C:\Users\A\Documents\Untitled11.exe
Compiler Resources Compile Log Debug Find Results
Abort Compilation
Shorten compiler paths
Line: 10 Col: 1 Sel: 0 Lines: 10 Length: 168
Activate Windows
Go to Settings to activate Windows.
Type here to search
35°C Sunny
5:49 AM
9/10/2023

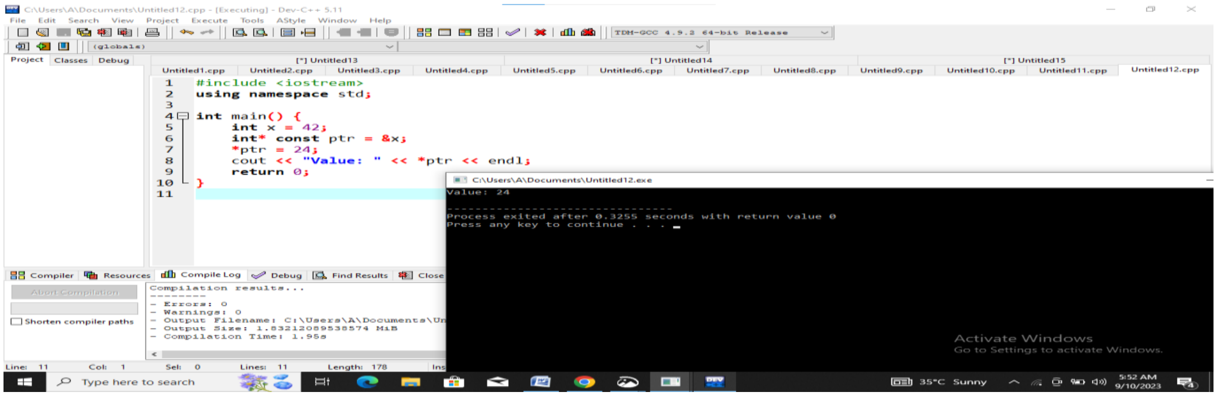
```
#include <iostream>
using namespace std;

int main() {
    const int x = 42;
    const int* ptr = &x;
    cout << "Value: " << *ptr << endl;
    return 0;
}
```

```
Value: 42

--------------------------------
Process exited after 0.9043 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documen
- Output Size: 1.83212089538574 MiB
- Compilation Time: 4.63s
```

## 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;

}
```



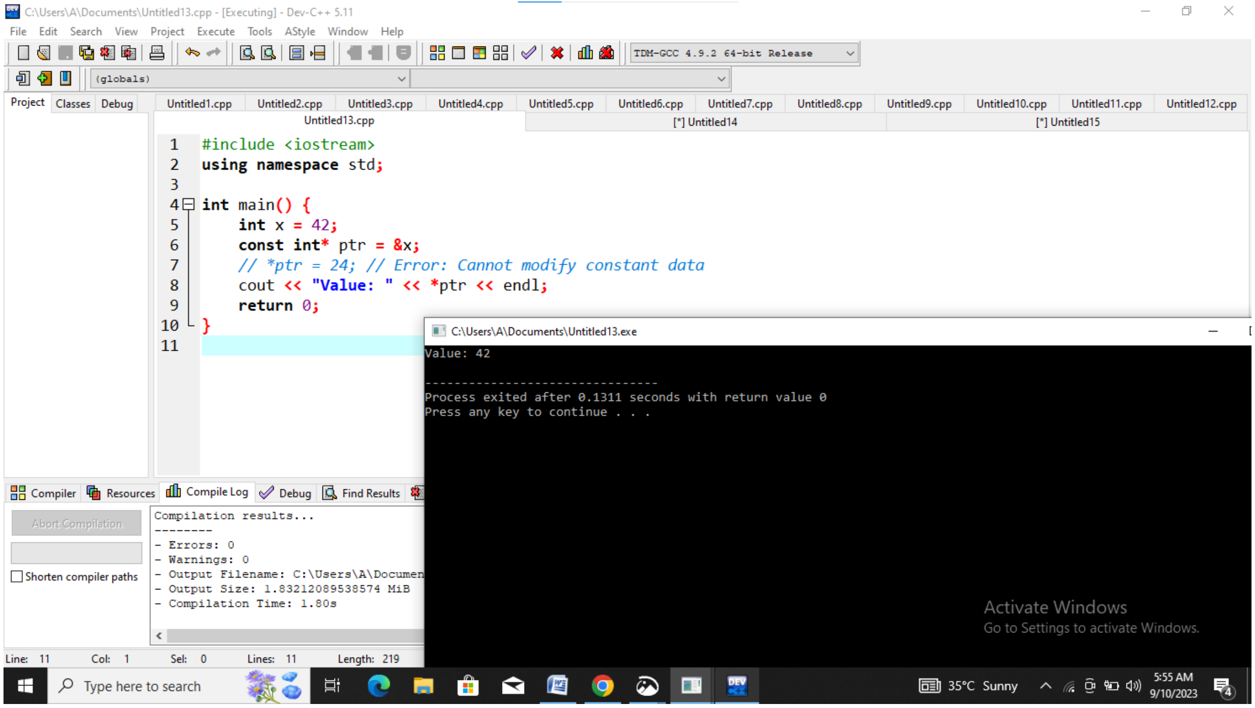
```
#include <iostream>
using namespace std;

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

```
Value: 24

--------------------------------
Process exited after 0.3255 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documents\Un
- Output Size: 1.83212089538574 MiB
- Compilation Time: 1.95s
```

## 13. Pointer to Constant Data:

```
#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;

}
```



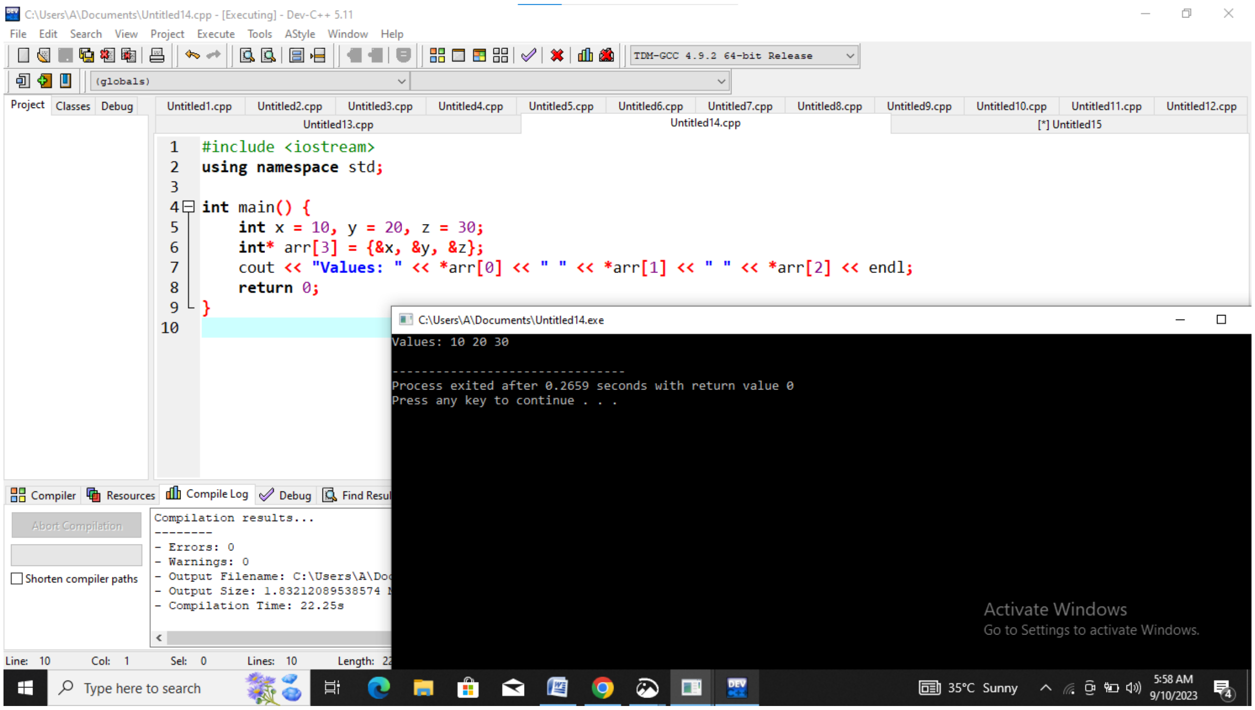
```
#include <iostream>
using namespace std;

int main() {
    int x = 42;
    const int* ptr = &x;
    // *ptr = 24; // Error: Cannot modify constant data
    cout << "Value: " << *ptr << endl;
    return 0;
}
```

```
Value: 42

--------------------------------
Process exited after 0.1311 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Documen
- Output Size: 1.83212089538574 MiB
- Compilation Time: 1.80s
```

## 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;

}
```


C:\Users\A\Documents\Untitled14.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
Untitled1.cpp Untitled2.cpp Untitled3.cpp Untitled4.cpp Untitled5.cpp Untitled6.cpp Untitled7.cpp Untitled8.cpp Untitled9.cpp Untitled10.cpp Untitled11.cpp Untitled12.cpp Untitled13.cpp Untitled14.cpp [*] Untitled15
C:\Users\A\Documents\Untitled14.exe
Compiler Resources Compile Log Debug Find Resul
Abort Compilation
Shorten compiler paths
Line: 10 Col: 1 Sel: 0 Lines: 10 Length: 22
Activate Windows
Go to Settings to activate Windows.
Type here to search
35°C Sunny
5:58 AM
9/10/2023

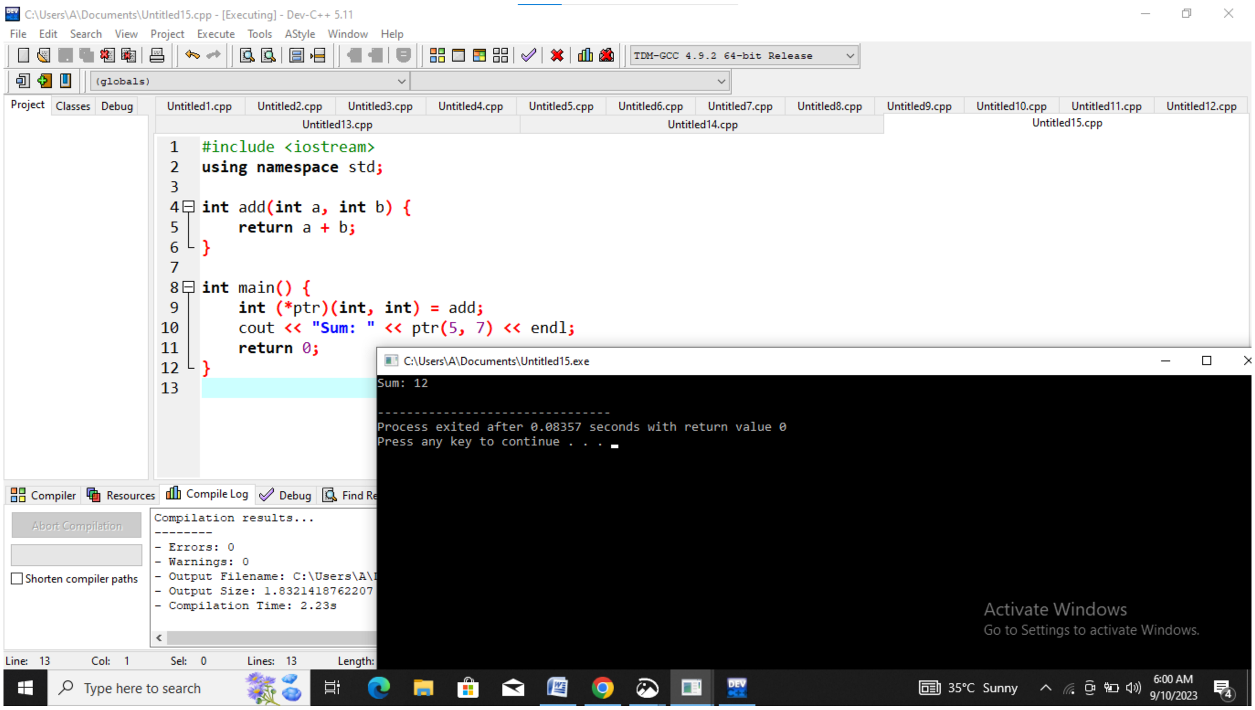
```
#include <iostream>
using namespace std;

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;
}
```

```
Values: 10 20 30

--------------------------------
Process exited after 0.2659 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\Doc
- Output Size: 1.83212089538574 M
- Compilation Time: 22.25s
```

## 15. Pointers to Functions:

```
#include <iostream>

using namespace std;


int add(int a, int b) {

   return a + b;

}

int main() {
   int (*ptr)(int, int) = add;

   cout << "Sum: " << ptr(5, 7) << endl;

   return 0;

}
```



C:\Users\A\Documents\Untitled15.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
Untitled1.cpp Untitled2.cpp Untitled3.cpp Untitled4.cpp Untitled5.cpp Untitled6.cpp Untitled7.cpp Untitled8.cpp Untitled9.cpp Untitled10.cpp Untitled11.cpp Untitled12.cpp Untitled13.cpp Untitled14.cpp Untitled15.cpp

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

int add(int a, int b) {
    return a + b;
}

int main() {
    int (*ptr)(int, int) = add;
    cout << "Sum: " << ptr(5, 7) << endl;
    return 0;
}
```

Compiler Resources Compile Log Debug Find Re
Abort Compilation
□ Shorten compiler paths

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\A\I
- Output Size: 1.8321418762207
- Compilation Time: 2.23s
```

Line: 13 Col: 1 Sel: 0 Lines: 13 Length:
C:\Users\A\Documents\Untitled15.exe

```
Sum: 12

--------------------------------
Process exited after 0.08357 seconds with return value 0
Press any key to continue . . .
```

Activate Windows
Go to Settings to activate Windows.
Type here to search
35°C Sunny
6:00 AM
9/10/2023