DATA STRUCTURE LAB TASK 1:

Submitted by:

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Section : B

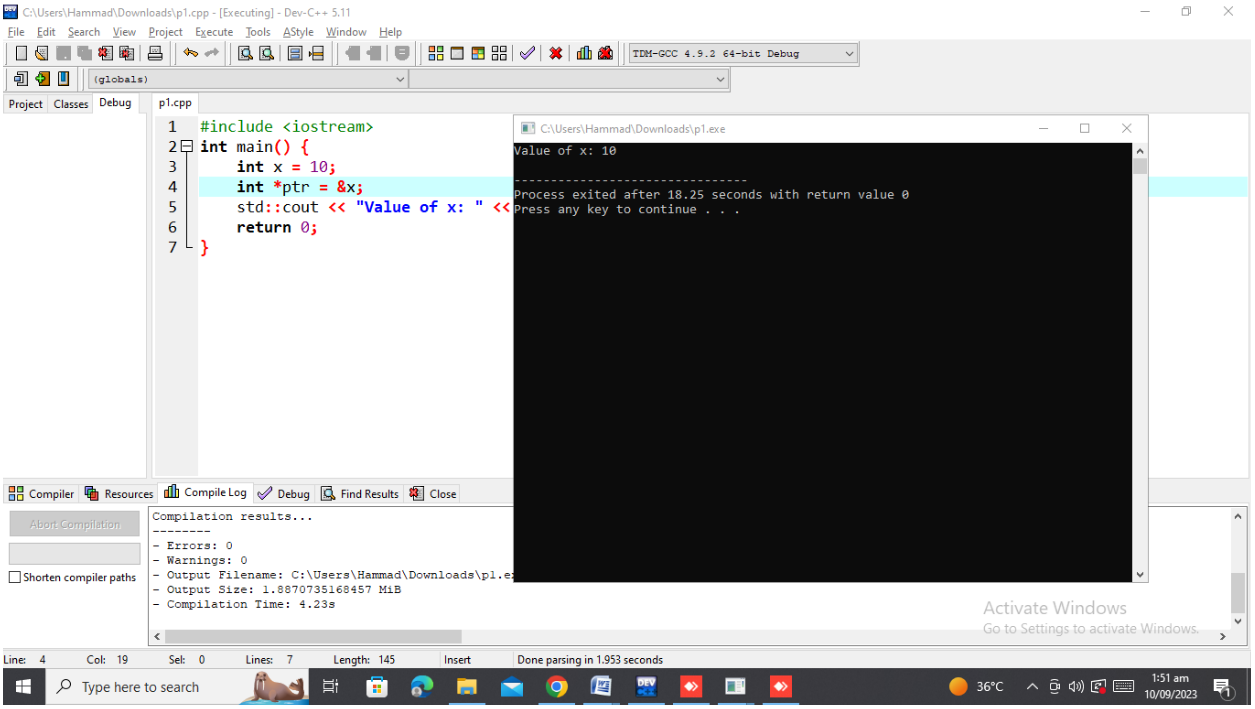
Submitted to:

Mam Yasmeen Jana

ACTIVITY 1: Programs of Pointer:

1.Pointer Declaration and Initialization:

```
#include <iostream>

int main() {

   int x = 10;

   int *ptr = &x;

   std::cout << "Value of x: " << *ptr << std::endl;

   return 0;

}
```



C:\Users\Hammad\Downloads\p1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp
C:\Users\Hammad\Downloads\p1.exe
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Type here to search
36°C
1:51 am
10/09/2023
Activate Windows
Go to Settings to activate Windows.

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

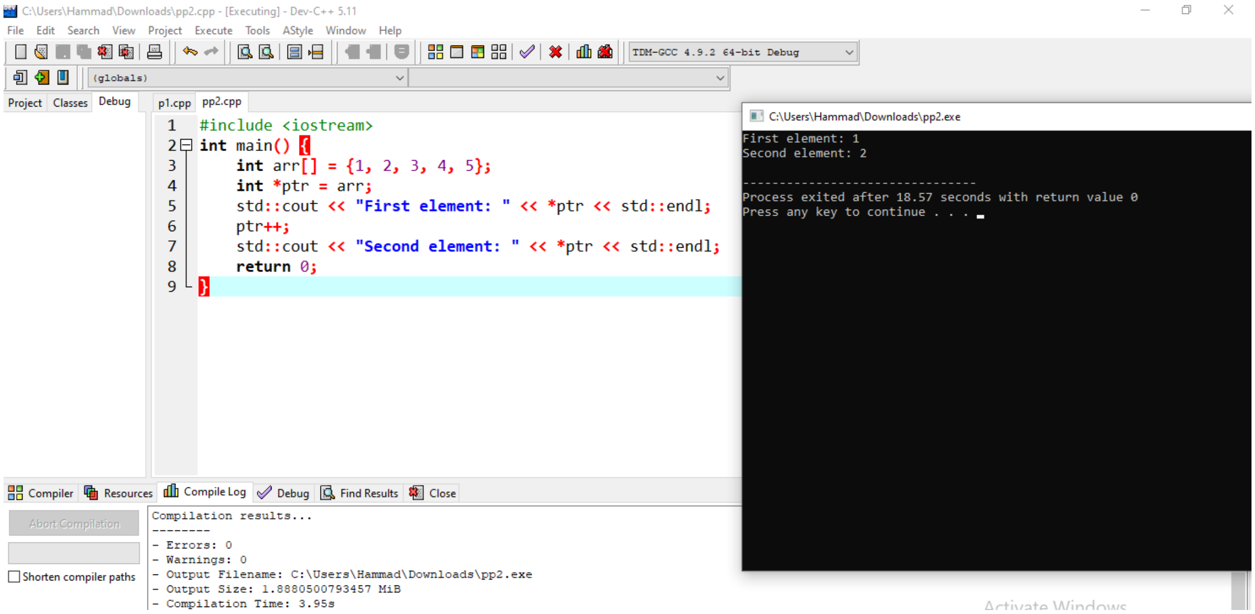
```
Value of x: 10

--------------------------------
Process exited after 18.25 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\p1.e
- Output Size: 1.8870735168457 MiB
- Compilation Time: 4.23s
```

Line: 4 Col: 19 Sel: 0 Lines: 7 Length: 145 Insert Done parsing in 1.953 seconds

2.Pointer Arithmetic:

```
#include <iostream>

int main() {

    int arr[] = {1, 2, 3, 4, 5};

    int *ptr = arr;

    std::cout << "First element: " << *ptr << std::endl;

    ptr++;

    std::cout << "Second element: " << *ptr << std::endl;

    return 0;

}
```



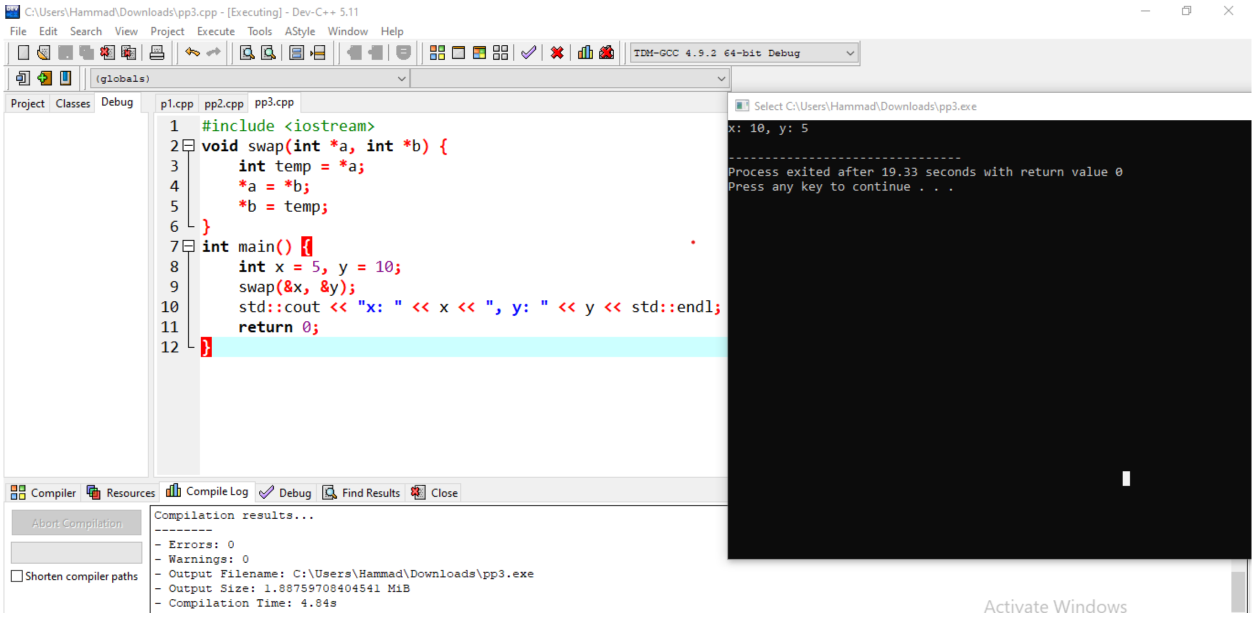
```
#include <iostream>
int main() {
    int arr[] = {1, 2, 3, 4, 5};
    int *ptr = arr;
    std::cout << "First element: " << *ptr << std::endl;
    ptr++;
    std::cout << "Second element: " << *ptr << std::endl;
    return 0;
}
```

```
First element: 1
Second element: 2

--------------------------------
Process exited after 18.57 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp2.exe
- Output Size: 1.8880500793457 MiB
- Compilation Time: 3.95s
```

3. Passing Pointers to Functions:

```
#include <iostream>
void swap(int *a, int *b) {
    int temp = *a;
    *a = *b;
    *b = temp;
}
int main() {
    int x = 5, y = 10;
    swap(&x, &y);
    std::cout << "x: " << x << ", y: " << y << std::endl;
    return 0;
}
```


C:\Users\Hammad\Downloads\pp3.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp
Select C:\Users\Hammad\Downloads\pp3.exe
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
□ Shorten compiler paths
Activate Windows

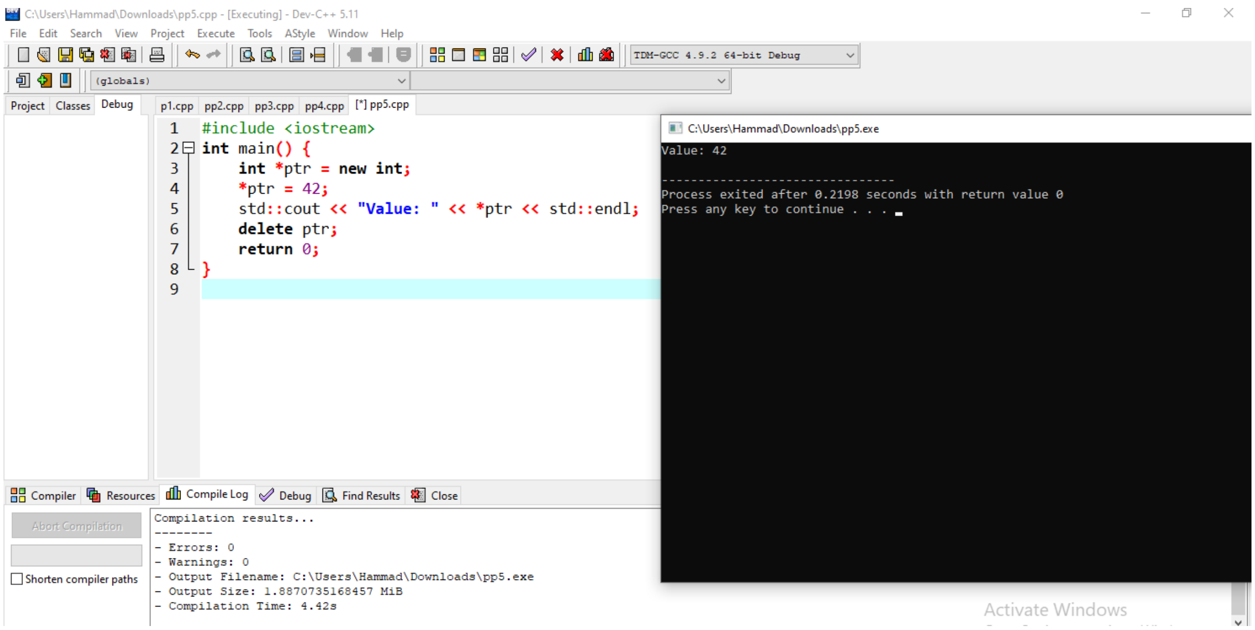
```cpp
#include <iostream>
void swap(int *a, int *b) {
    int temp = *a;
    *a = *b;
    *b = temp;
}
int main() {
    int x = 5, y = 10;
    swap(&x, &y);
    std::cout << "x: " << x << ", y: " << y << std::endl;
    return 0;
}
```

```
x: 10, y: 5

--------------------------------
Process exited after 19.33 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp3.exe
- Output Size: 1.88759708404541 MiB
- Compilation Time: 4.84s
```

4.Dynamic Memory Allocation (New and Delete):

```
#include <iostream>

int main() {

    int *ptr = new int;

    *ptr = 42;

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

    delete ptr;

    return 0;

}
```


C:\Users\Hammad\Downloads\pp5.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
□ Shorten compiler paths
Activate Windows

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

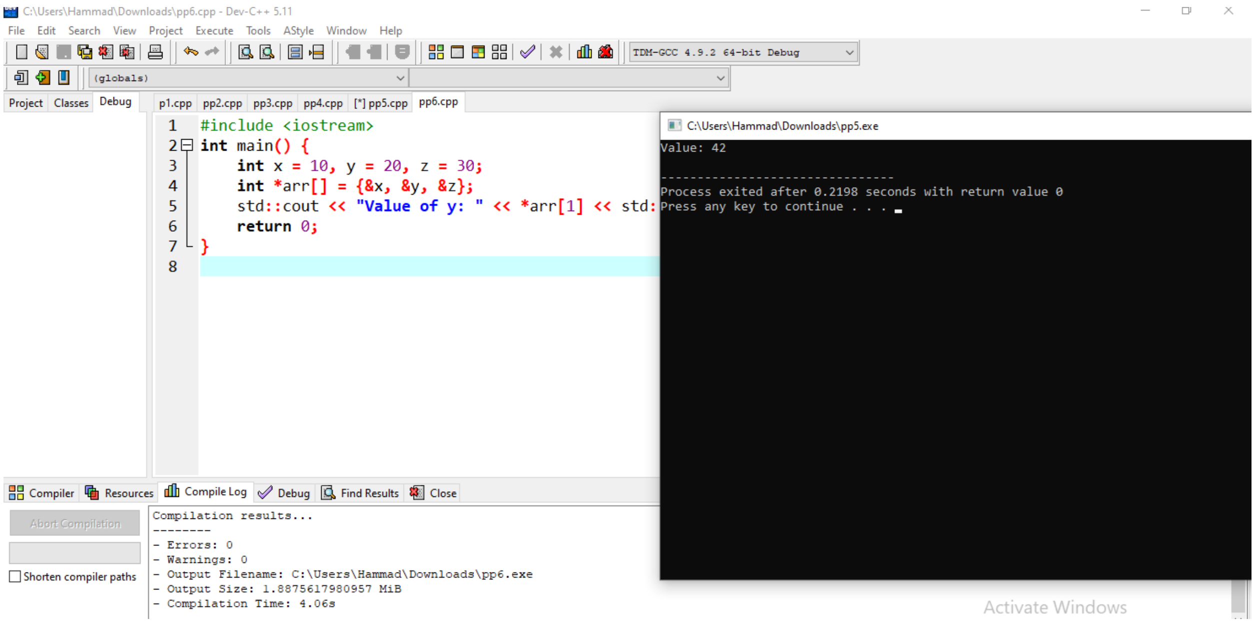
C:\Users\Hammad\Downloads\pp5.exe

```
Value: 42

--------------------------------
Process exited after 0.2198 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp5.exe
- Output Size: 1.8870735168457 MiB
- Compilation Time: 4.42s
```

5. Array of Pointers:

```
#include <iostream>

int main() {

    int x = 10, y = 20, z = 30;

    int *arr[] = {&x, &y, &z};

    std::cout << "Value of y: " << *arr[1] << std::endl;

    return 0;

}
```


C:\Users\Hammad\Downloads\pp6.cpp - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp pp6.cpp
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
☐ Shorten compiler paths
C:\Users\Hammad\Downloads\pp5.exe
Activate Windows

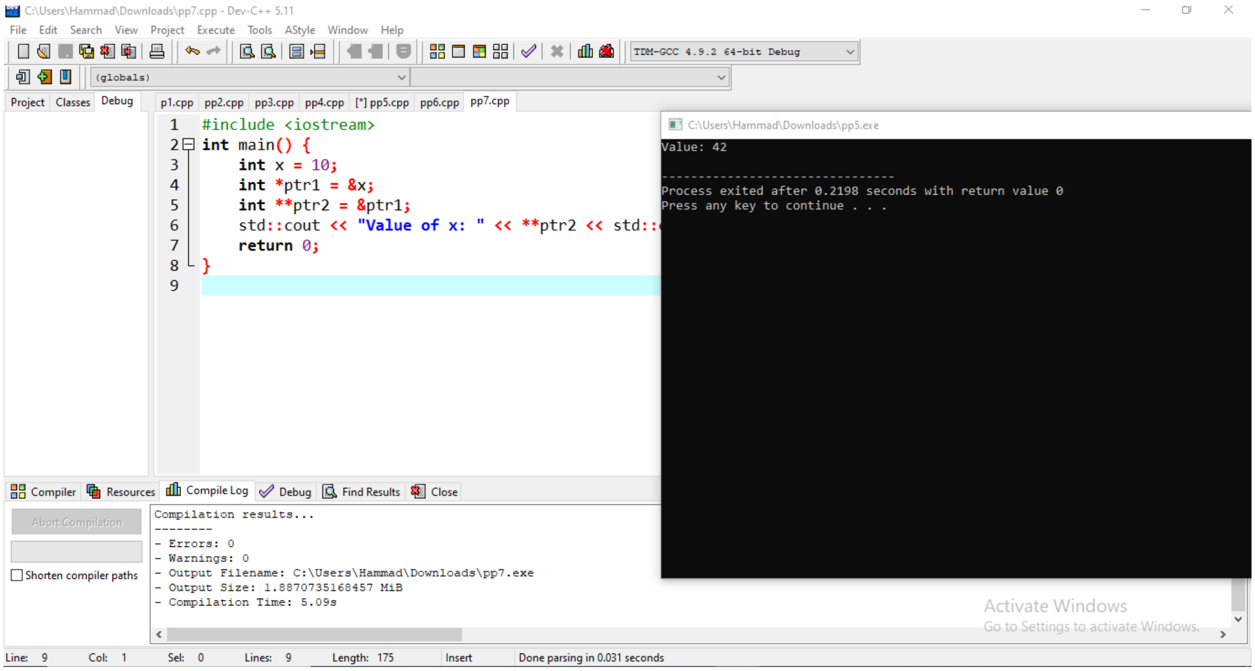
```
#include <iostream>
int main() {
    int x = 10, y = 20, z = 30;
    int *arr[] = {&x, &y, &z};
    std::cout << "Value of y: " << *arr[1] << std:
    return 0;
}
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp6.exe
- Output Size: 1.8875617980957 MiB
- Compilation Time: 4.06s
```

```
Value: 42

--------------------------------
Process exited after 0.2198 seconds with return value 0
Press any key to continue . . .
```

6. Pointer to Pointer (Double Pointer):

```
#include <iostream>

int main() {

    int x = 10;

    int *ptr1 = &x;

    int **ptr2 = &ptr1;

    std::cout << "Value of x: " << **ptr2 << std::endl;

    return 0;

}
```


C:\Users\Hammad\Downloads\pp7.cpp - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp pp6.cpp pp7.cpp
C:\Users\Hammad\Downloads\pp5.exe
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
□ Shorten compiler paths
Activate Windows
Go to Settings to activate Windows.
Line: 9 Col: 1 Sel: 0 Lines: 9 Length: 175 Insert Done parsing in 0.031 seconds

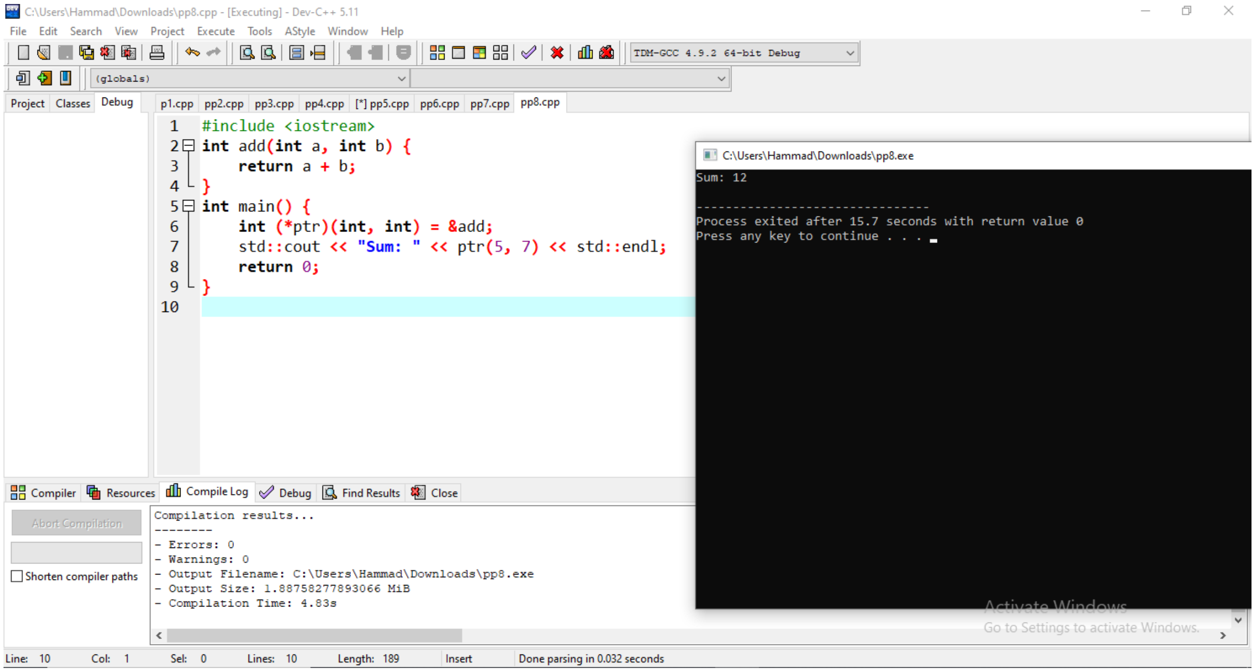
```
#include <iostream>
int main() {
    int x = 10;
    int *ptr1 = &x;
    int **ptr2 = &ptr1;
    std::cout << "Value of x: " << **ptr2 << std::
    return 0;
}
```

```
Value: 42

--------------------------------
Process exited after 0.2198 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp7.exe
- Output Size: 1.8870735168457 MiB
- Compilation Time: 5.09s
```

7. Pointer to Function:

```
#include <iostream>

int add(int a, int b) {

    return a + b;

}

int main() {

    int (*ptr)(int, int) = &add;

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

    return 0;

}
```


C:\Users\Hammad\Downloads\pp8.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp pp6.cpp pp7.cpp pp8.cpp
C:\Users\Hammad\Downloads\pp8.exe
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Activate Windows
Go to Settings to activate Windows.
Line: 10 Col: 1 Sel: 0 Lines: 10 Length: 189 Insert Done parsing in 0.032 seconds

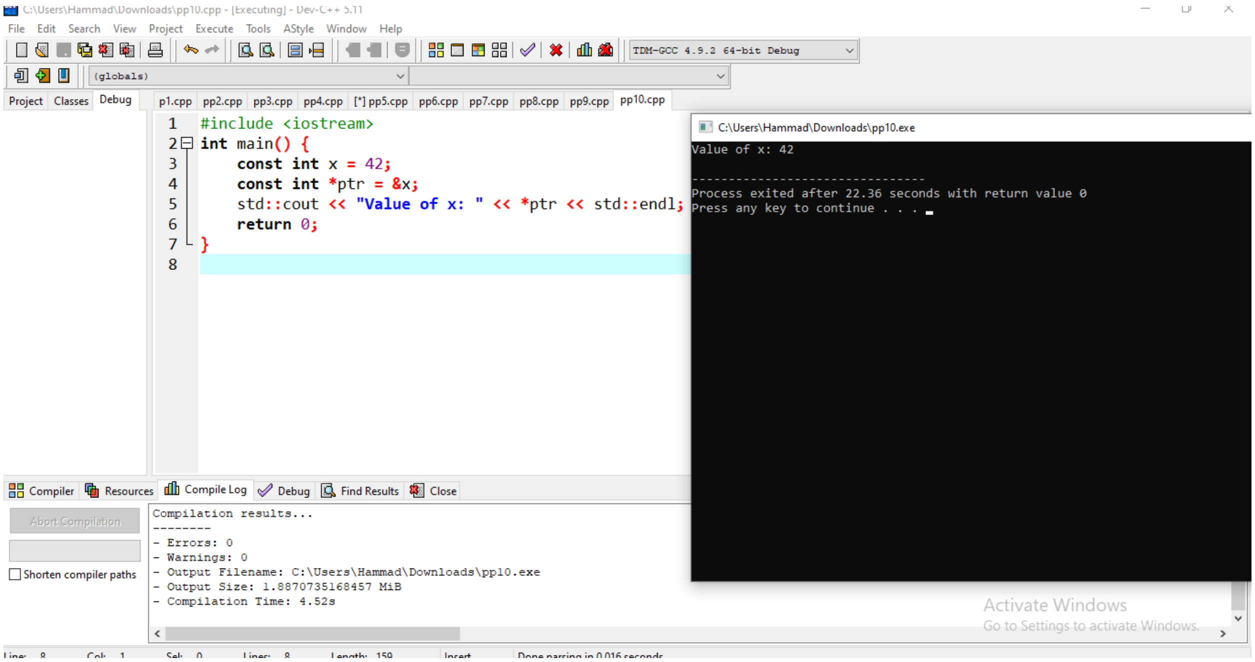
```
#include <iostream>
int add(int a, int b) {
    return a + b;
}
int main() {
    int (*ptr)(int, int) = &add;
    std::cout << "Sum: " << ptr(5, 7) << std::endl;
    return 0;
}
```

```
Sum: 12

--------------------------------
Process exited after 15.7 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp8.exe
- Output Size: 1.88758277893066 MiB
- Compilation Time: 4.83s
```

8. Pointer to Constant Data:

```
#include <iostream>

int main() {

    const int x = 42;

    const int *ptr = &x;

    std::cout << "Value of x: " << *ptr << std::endl;

    return 0;

}
```



C:\Users\Hammad\Downloads\pp10.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp pp6.cpp pp7.cpp pp8.cpp pp9.cpp pp10.cpp
C:\Users\Hammad\Downloads\pp10.exe
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Activate Windows
Go to Settings to activate Windows.

```cpp
#include <iostream>
int main() {
    const int x = 42;
    const int *ptr = &x;
    std::cout << "Value of x: " << *ptr << std::endl;
    return 0;
}
```

```
Value of x: 42

--------------------------------
Process exited after 22.36 seconds with return value 0
Press any key to continue . . .
```

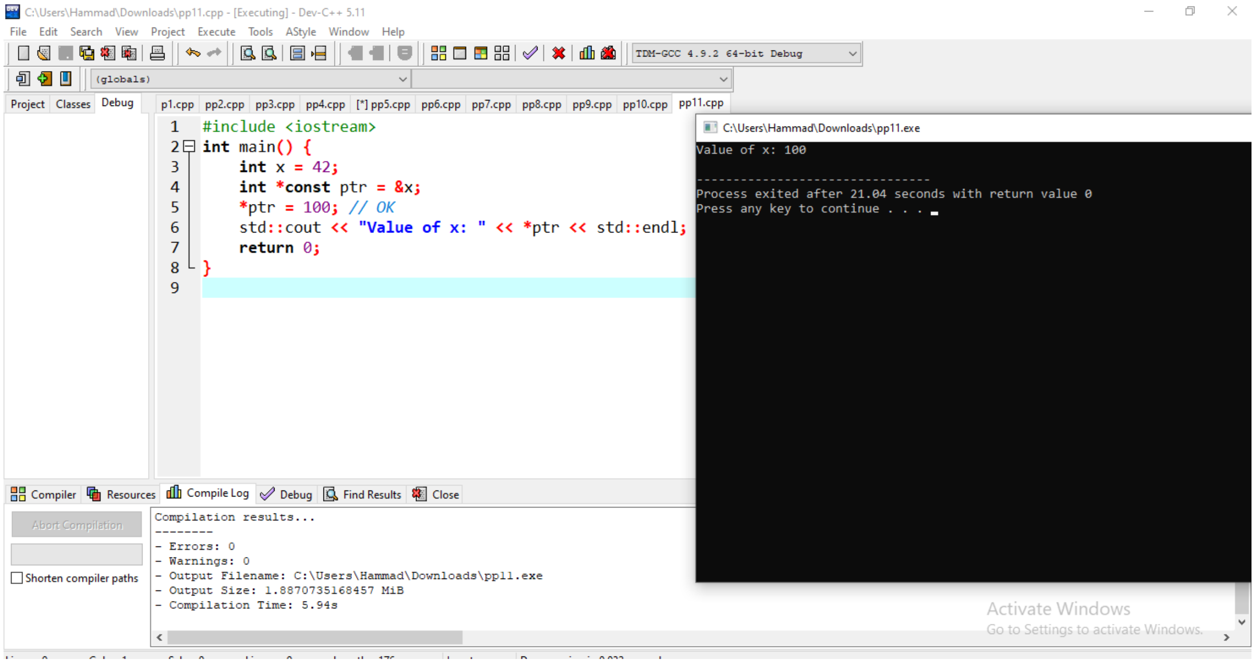
□ Shorten compiler paths

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp10.exe
- Output Size: 1.8870735168457 MiB
- Compilation Time: 4.52s
```

Line: 8 Col: 1 Sel: 0 Lines: 8 Length: 159 Insert Done parsing in 0.016 seconds

9. Constant Pointers:

```cpp
#include <iostream>

int main() {

    int x = 42;

    int *const ptr = &x;

    *ptr = 100; // OK

    std::cout << "Value of x: " << *ptr << std::endl;

    return 0;

}
```


C:\Users\Hammad\Downloads\pp11.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp pp6.cpp pp7.cpp pp8.cpp pp9.cpp pp10.cpp pp11.cpp
C:\Users\Hammad\Downloads\pp11.exe
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
□ Shorten compiler paths
Activate Windows
Go to Settings to activate Windows.

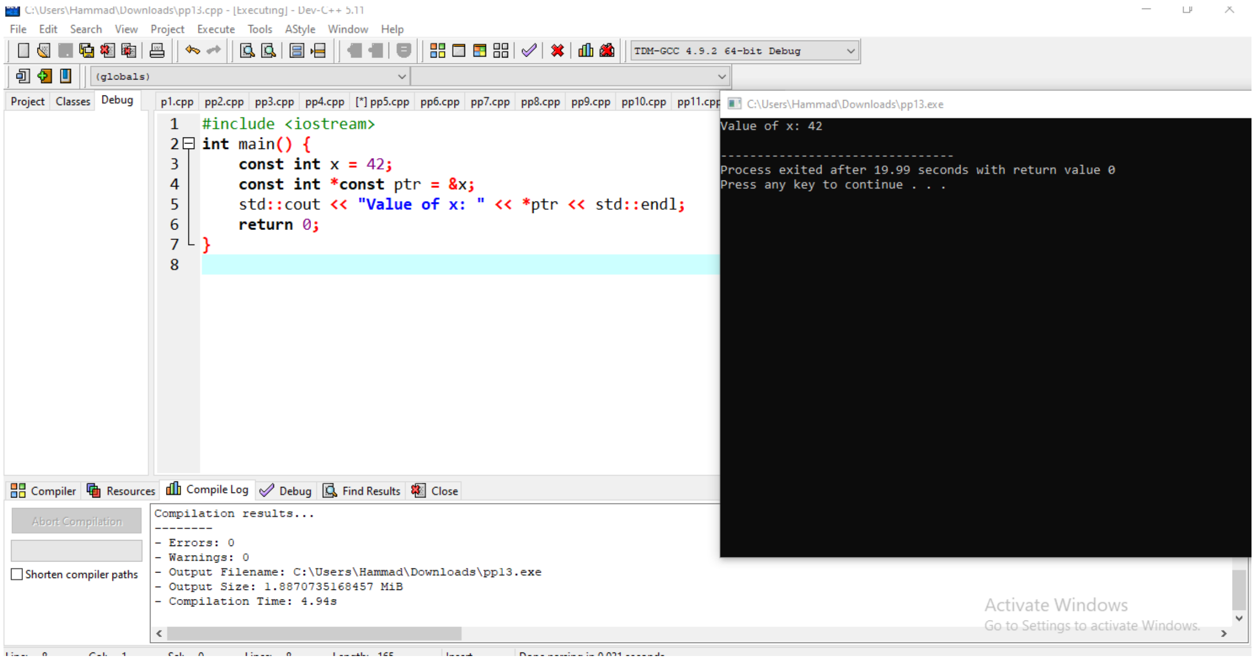
```cpp
#include <iostream>
int main() {
    int x = 42;
    int *const ptr = &x;
    *ptr = 100; // OK
    std::cout << "Value of x: " << *ptr << std::endl;
    return 0;
}
```

```
Value of x: 100

--------------------------------
Process exited after 21.04 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp11.exe
- Output Size: 1.8870735168457 MiB
- Compilation Time: 5.94s
```

10. Pointer to Constant Data and Constant Pointer:

```cpp
#include <iostream>

int main() {

    const int x = 42;

    const int *const ptr = &x;

    std::cout << "Value of x: " << *ptr << std::endl;

    return 0;

}
```


C:\Users\Hammad\Downloads\pp13.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp pp6.cpp pp7.cpp pp8.cpp pp9.cpp pp10.cpp pp11.cpp
C:\Users\Hammad\Downloads\pp13.exe
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
□ Shorten compiler paths
Activate Windows
Go to Settings to activate Windows.

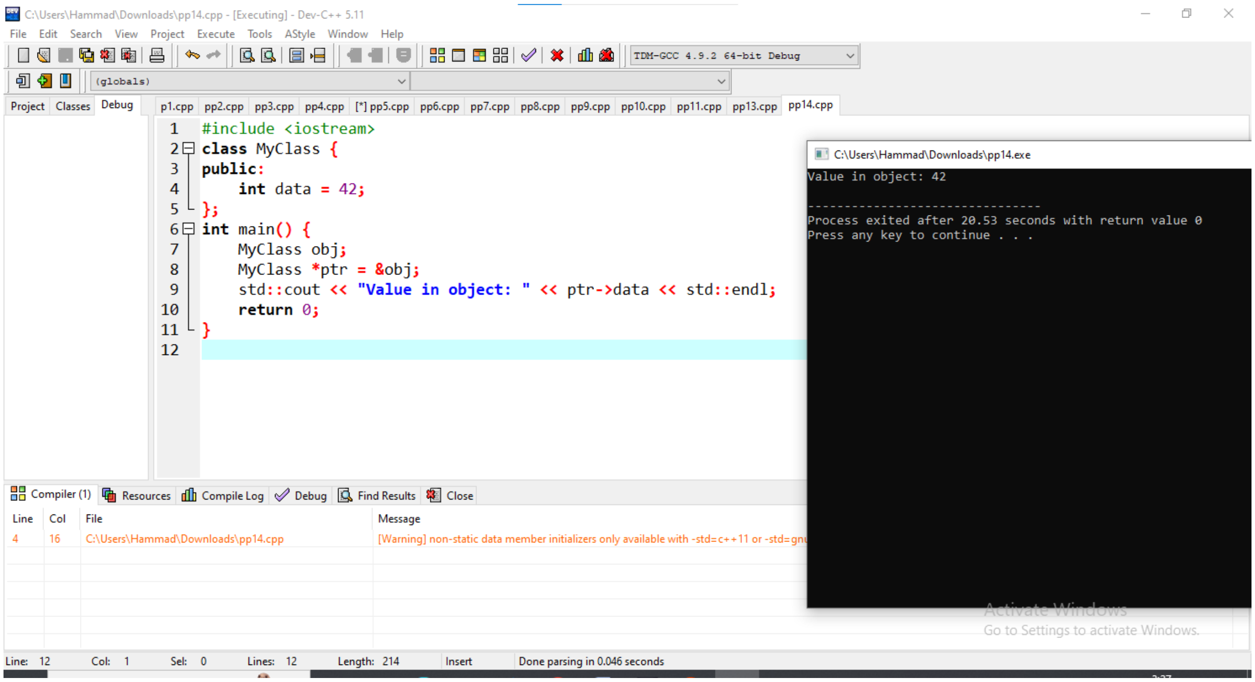
```
#include <iostream>
int main() {
    const int x = 42;
    const int *const ptr = &x;
    std::cout << "Value of x: " << *ptr << std::endl;
    return 0;
}
```

```
Value of x: 42

--------------------------------
Process exited after 19.99 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp13.exe
- Output Size: 1.8870735168457 MiB
- Compilation Time: 4.94s
```

11. Pointer to Object in Classes:

```
#include <iostream>

class MyClass {

public:

    int data = 42;

};

int main() {

    MyClass obj;

    MyClass *ptr = &obj;

    std::cout << "Value in object: " << ptr->data << std::endl;

    return 0;

}
```


C:\Users\Hammad\Downloads\pp14.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp pp6.cpp pp7.cpp pp8.cpp pp9.cpp pp10.cpp pp11.cpp pp13.cpp pp14.cpp
C:\Users\Hammad\Downloads\pp14.exe
Compiler (1) Resources Compile Log Debug Find Results Close
Activate Windows
Go to Settings to activate Windows.

```cpp
#include <iostream>
class MyClass {
public:
    int data = 42;
};
int main() {
    MyClass obj;
    MyClass *ptr = &obj;
    std::cout << "Value in object: " << ptr->data << std::endl;
    return 0;
}

```

```
Value in object: 42

--------------------------------
Process exited after 20.53 seconds with return value 0
Press any key to continue . . .
```

Line	Col	File	Message
4	16	C:\Users\Hammad\Downloads\pp14.cpp	[Warning] non-static data member initializers only available with -std=c++11 or -std=gnu

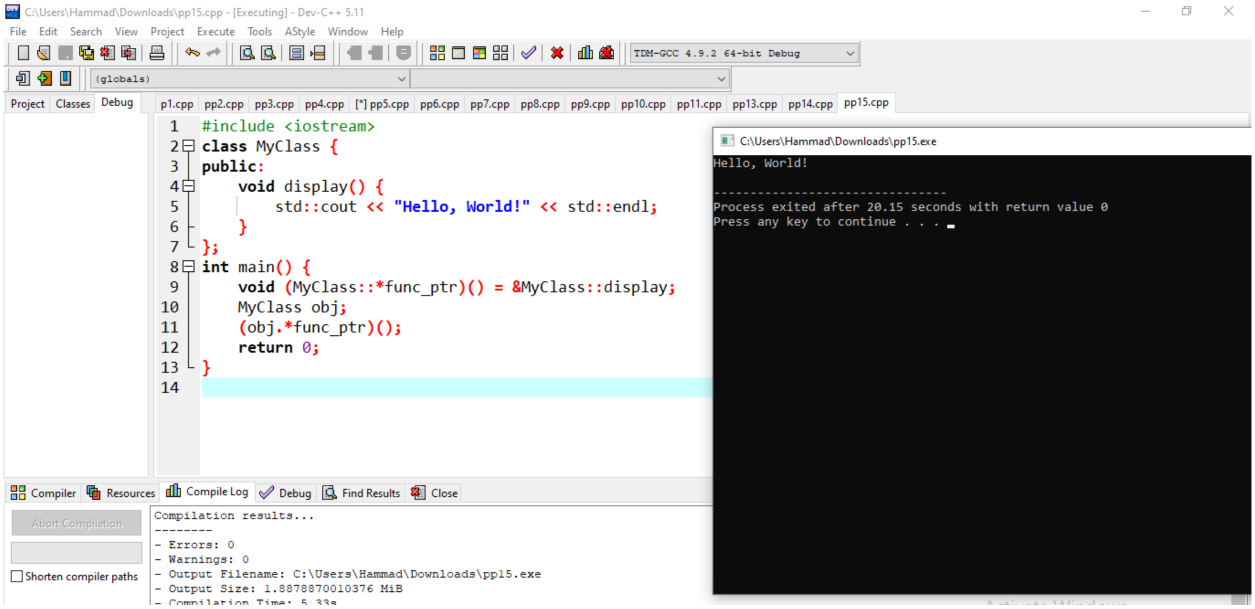
Line: 12 Col: 1 Sel: 0 Lines: 12 Length: 214 Insert Done parsing in 0.046 seconds

12. Pointer to Member Function in Classes:

```cpp
#include <iostream>
class MyClass {
public:
    void display() {
        std::cout << "Hello, World!" << std::endl;
    }
};
int main() {
    void (MyClass::*func_ptr)() = &MyClass::display;
    MyClass obj;
    (obj.*func_ptr)();
```

return 0;

}


C:\Users\Hammad\Downloads\pp15.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp pp6.cpp pp7.cpp pp8.cpp pp9.cpp pp10.cpp pp11.cpp pp13.cpp pp14.cpp pp15.cpp
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
□ Shorten compiler paths
C:\Users\Hammad\Downloads\pp15.exe

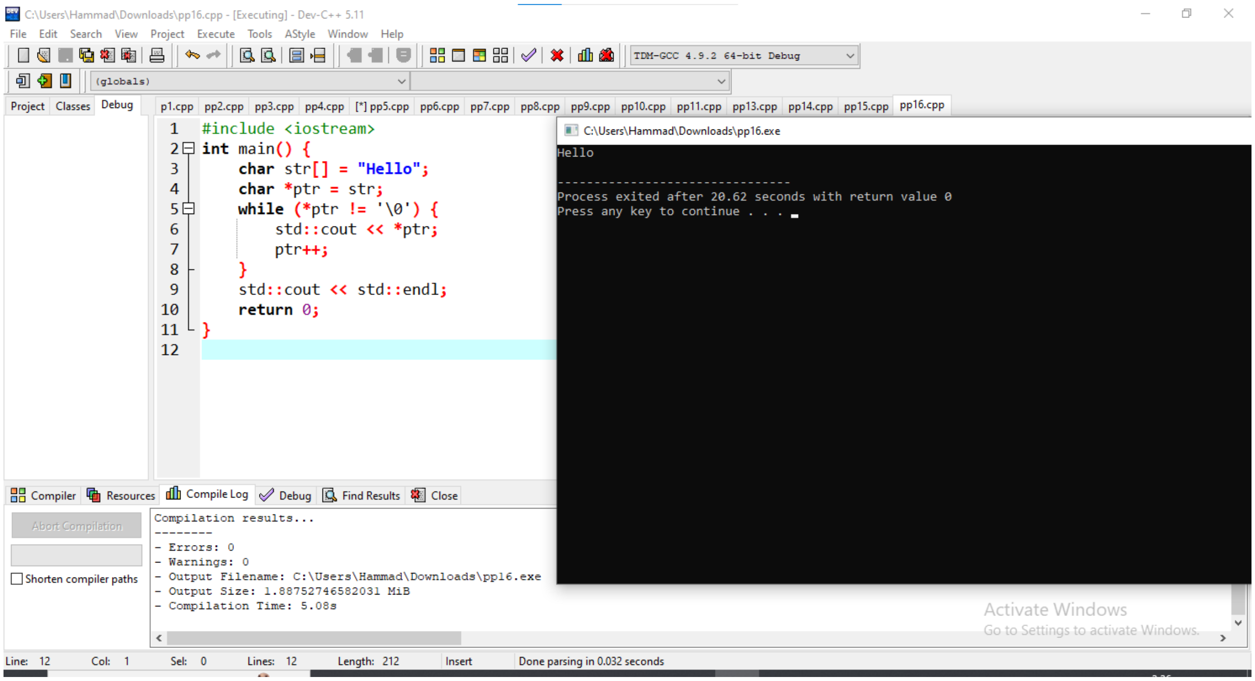
```cpp
#include <iostream>
class MyClass {
public:
    void display() {
        std::cout << "Hello, World!" << std::endl;
    }
};
int main() {
    void (MyClass::*func_ptr)() = &MyClass::display;
    MyClass obj;
    (obj.*func_ptr)();
    return 0;
}
```

```
Hello, World!

--------------------------------
Process exited after 20.15 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp15.exe
- Output Size: 1.8878870010376 MiB
- Compilation Time: 5.33s
```

13. Pointer Arithmetic with Character Arrays:

```cpp
#include <iostream>

int main() {

    char str[] = "Hello";

    char *ptr = str;

    while (*ptr != '\0') {

        std::cout << *ptr;

        ptr++;

    }

    std::cout << std::endl;

    return 0;
}
```



C:\Users\Hammad\Downloads\pp16.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp pp6.cpp pp7.cpp pp8.cpp pp9.cpp pp10.cpp pp11.cpp pp13.cpp pp14.cpp pp15.cpp pp16.cpp
C:\Users\Hammad\Downloads\pp16.exe
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Activate Windows
Go to Settings to activate Windows.

```
#include <iostream>
int main() {
    char str[] = "Hello";
    char *ptr = str;
    while (*ptr != '\0') {
        std::cout << *ptr;
        ptr++;
    }
    std::cout << std::endl;
    return 0;
}
```

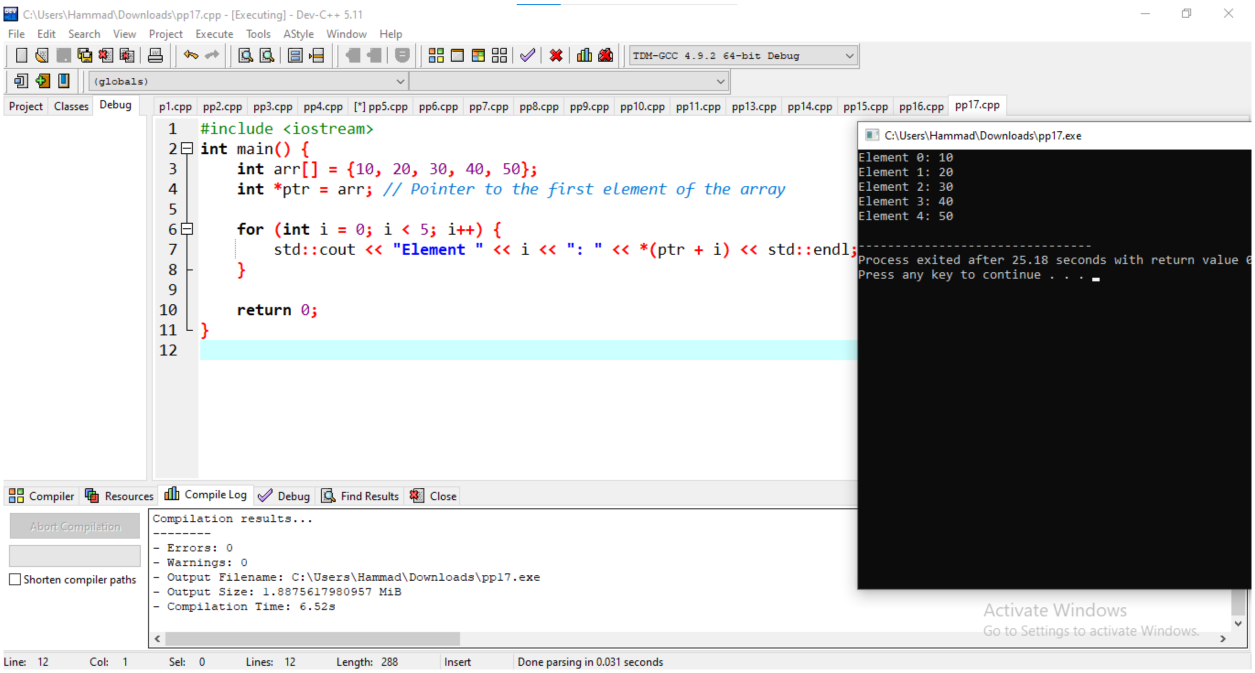
```
Hello

--------------------------------
Process exited after 20.62 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp16.exe
- Output Size: 1.88752746582031 MiB
- Compilation Time: 5.08s
```

Line: 12 Col: 1 Sel: 0 Lines: 12 Length: 212 Insert Done parsing in 0.032 seconds

14. Pointer to Array of Integers:

```
#include <iostream>

int main() {

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

    int *ptr = arr; // Pointer to the first element of the array


    for (int i = 0; i < 5; i++) {

        std::cout << "Element " << i << ": " << *(ptr + i) << std::endl;

    }


    return 0;

}
```


C:\Users\Hammad\Downloads\pp17.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp pp6.cpp pp7.cpp pp8.cpp pp9.cpp pp10.cpp pp11.cpp pp13.cpp pp14.cpp pp15.cpp pp16.cpp pp17.cpp
C:\Users\Hammad\Downloads\pp17.exe
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Activate Windows
Go to Settings to activate Windows.
Line: 12 Col: 1 Sel: 0 Lines: 12 Length: 288 Insert Done parsing in 0.031 seconds

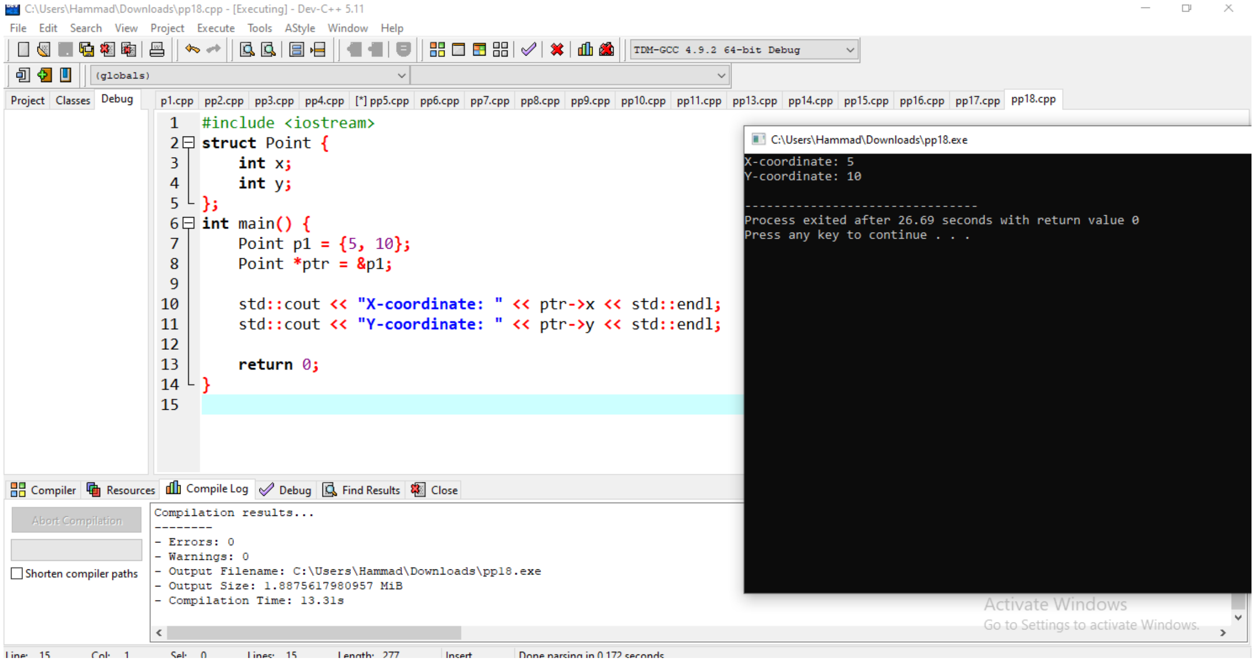
```cpp
#include <iostream>
int main() {
    int arr[] = {10, 20, 30, 40, 50};
    int *ptr = arr; // Pointer to the first element of the array

    for (int i = 0; i < 5; i++) {
        std::cout << "Element " << i << ": " << *(ptr + i) << std::endl;
    }

    return 0;
}
```

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

--------------------------------
Process exited after 25.18 seconds with return value
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp17.exe
- Output Size: 1.8875617980957 MiB
- Compilation Time: 6.52s
```

15. Pointer to a Structure:

```cpp
#include <iostream>
struct Point {
    int x;
    int y;
};
int main() {
    Point p1 = {5, 10};
    Point *ptr = &p1;

    std::cout << "X-coordinate: " << ptr->x << std::endl;
    std::cout << "Y-coordinate: " << ptr->y << std::endl;
    return 0;
}
```



C:\Users\Hammad\Downloads\pp18.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Debug
(globals)
Project Classes Debug
p1.cpp pp2.cpp pp3.cpp pp4.cpp [*] pp5.cpp pp6.cpp pp7.cpp pp8.cpp pp9.cpp pp10.cpp pp11.cpp pp13.cpp pp14.cpp pp15.cpp pp16.cpp pp17.cpp pp18.cpp
C:\Users\Hammad\Downloads\pp18.exe
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Line: 15 Col: 1 Sel: 0 Lines: 15 Length: 277 Insert Done parsing in 0.172 seconds
Activate Windows
Go to Settings to activate Windows.

```cpp
#include <iostream>
struct Point {
    int x;
    int y;
};
int main() {
    Point p1 = {5, 10};
    Point *ptr = &p1;

    std::cout << "X-coordinate: " << ptr->x << std::endl;
    std::cout << "Y-coordinate: " << ptr->y << std::endl;

    return 0;
}
```

```
X-coordinate: 5
Y-coordinate: 10

--------------------------------
Process exited after 26.69 seconds with return value 0
Press any key to continue . . .
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Hammad\Downloads\pp18.exe
- Output Size: 1.8875617980957 MiB
- Compilation Time: 13.31s
```

Activity 2: <u>HOW DO I CREATE MY ACCOUNT ON GITHUB.COM:</u>

GitHub is a platform for version control and collaborative coding, and it's widely used by developers for hosting and sharing code repositories. Here are the steps to create an account on GitHub:

1. <u>Visit GitHub's Website:</u>

I Open my web browser and go to the GitHub website by typing https://github.com into the address bar and press "Enter."

2. Sign Up:

On GitHub's homepage, I saw "Sign up for GitHub" form. I provide the following information:

3. Username:

I choose a unique username(Sadiajaved-113) on GitHub.

4. Email:

I enter my email address. Then I receive a confirmation email from github.com.

5. Password:

Then I create a secure password on my GitHub account.

6.Verify Email Address:

GitHub provide a verification email to my email address .Then I went to email inbox, find the email from GitHub, and click the verification link inside the email to confirm my email address.

7.Start Using GitHub:
Then my account is created and email verified, I start using GitHub.
