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# Additional Exercises

## Fill in the missing code

## Question 1:

```
#include<iostream>
#include<cstring>
using namespace std;
class String
{
private:
char *s;
int size;
public:
String(const char *str = NULL); // constructor
~String() {  delete [] s;}// destructor
String(const String&); // copy constructor
void print() { cout << s << endl; } // Function to print string
void change(const char *); // Function to change
};
String::String(const char *str)
{
size = strlen(str);
s = new char[size+1];
strcpy(s, str);
}
```

```
void String::change(const char *str)
{
}
String::String(const String& old_str)
{
}
int main()
{
String str1("GeeksQuiz");
String str2 = str1;
str1.print(); // what is printed ?
str2.print();
str2.change("GeeksforGeeks");
str1.print(); // what is printed now ?
str2.print();
return 0;
}
```

**Answer : delete [] s ;**

## Question 2:

```
#include<iostream>
using namespace std;
class Test
{
private:
int x;
int y;
```

```
public:
Test (int x = 0, int y = 0) { }
Test setX(int a) { x = a; return *this;}
Test setY(int b) { y = b; return *this;}
void print() { cout << "x = " << x << " y = " << y << endl; }
};
int main()
{
Test obj1;
obj1.setX(10).setY(20);
obj1.print();
return 0;
}
```

**Answer**: **return *this**

**Predict the output and give justifications.**

## Question 3:

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

{
private:
int x;
int y;
public:
Test(int x = 0, int y = 0) { this->x = x; this->y = y; }
```

```
static void fun1() { cout << "Inside fun1()"; }
static void fun2() { cout << "Inside fun2()"; this->fun1(); }
};
int main()
{
Test obj;
obj.fun2();
return 0;
}
```

## Answer:

**compilation error occurs as in fun2() a static member function is trying to use “this” pointer .static member functions do not have a distinct object associated with them , and can hence can only acesss either static data members or objects passed as parameters to it.**

## Question 4:

```
using namespace std;
class Test {
int value;
public:
Test(int v = 0) {value = v;}
int getValue() const { return ++value;}
};
int main() {
Test t(20);
cout<<t.getValue();
return 0;
}
```

**Answer:**

**compilation error as getvalue() is a const member function and thus should not be able to alter data members of an object**

**Question 5:**

```
class Test {
static Test * fun()
{
return this;
}
};
int main()
{
getchar();
return 0;
}
```

**Answer :**

**Compilation error.Fun() is a static member function and thus cannot use ‘this’ pointer**

## Question 6:

```
#include<iostream>
using namespace std;
class Test
{
private:
static int count;
public:
Test& fun();
};
int Test::count = 0;
Test& Test::fun()
{
Test::count++;
cout << Test::count << " ";
return *this;
}
int main()
{
Test t;
t.fun().fun().fun().fun();
return 0;
}
```

## Answer:

**no errors and output will be:**

**1 2 3 4**

**(reason: associativity of '.' Operator is left to right and count will be increment each time fun() is called by a different object as count is a static data member)**

## Question 7:

```
#include<iostream>
using namespace std;
class Point {
public:
Point() { cout << "Normal Constructor calledn"; }
Point(const Point &t) { cout << "Copy constructor calledn"; }
};
int main()
{
Point *t1, *t2;
t1 = new Point();
t2 = new Point(*t1);
Point t3 = *t1;
Point t4;
t4 = t3;
return 0;
}
```

## Answer :

**t1 = new Point(); will call normal constructor**

**t2 = new Point(*t1); will call copy constructor passing t1 by reference as parrameter**

**Point t3 = *t1; will call copy constructor passing t1 by reference as parrameter**

**Point t4; will call normal constructor, therefore :**

## Output:

**Normal Constructor called**

**Copy Constructor called**

**Copy Constructor called**

**Normal Constructor called**

## Question 8:

A program to demonstrate the concept of constructors and destructor

```
#include<iostream.h>
#include<conio.h>
#include<stdlib.h>
class DEPOSIT
{
long int principal;
int time;
float rate;
float totalamount;
public:
DEPOSIT(); // #1
DEPOSIT(long p, int t, float r); // #2
DEPOSIT(long p, int t); // #3
```

```
DEPOSIT(long p, float r); // #4
DEPOSIT(const Deposit &d); // #5
~DEPOSIT();
void calculateamount(void);
void display(void);
};
```

**main.cpp**

```
#include<iostream>
#include<cstdlib>
using namespace std;
#include "DEPOSIT.h"


int main()
{
    DEPOSIT a;
    DEPOSIT b(1000, 2, 1.00f);
    DEPOSIT c(2000, 1);
    DEPOSIT d(3000, 2.00f);
    DEPOSIT e(b);

    a.calculateamount();
    b.calculateamount();
    c.calculateamount();
    d.calculateamount();
    e.calculateamount();

    cout<<"\n\n\n\n   DEPOSIT a :  \n";
    a.display();
```

```
    cout<<"\n\n\n\n   DEPOSIT b(1000, 2, 1f)  :  \n";
    b.display();
    cout<<"\n\n\n\n   DEPOSIT c(2000, 1) : \n";
    c.display();
    cout<<"\n\n\n\n   DEPOSIT d(3000, 2f) :  \n";
    d.display();
    cout<<"\n\n\n\n    Deposit e(b) :   \n";
    e.display();

    return 0;
}
```

**DEPOSIT.h**

```
#ifndef DEPOSIT_H
#define DEPOSIT_H

class DEPOSIT
{
    long int principal;
    int time;
    float rate;
    float totalamount;

    public:
        DEPOSIT();
        DEPOSIT(long p, int t, float r);
        DEPOSIT(long p, int t);
        DEPOSIT(long p, float r);
       DEPOSIT(const DEPOSIT &d);
       ~DEPOSIT();
```

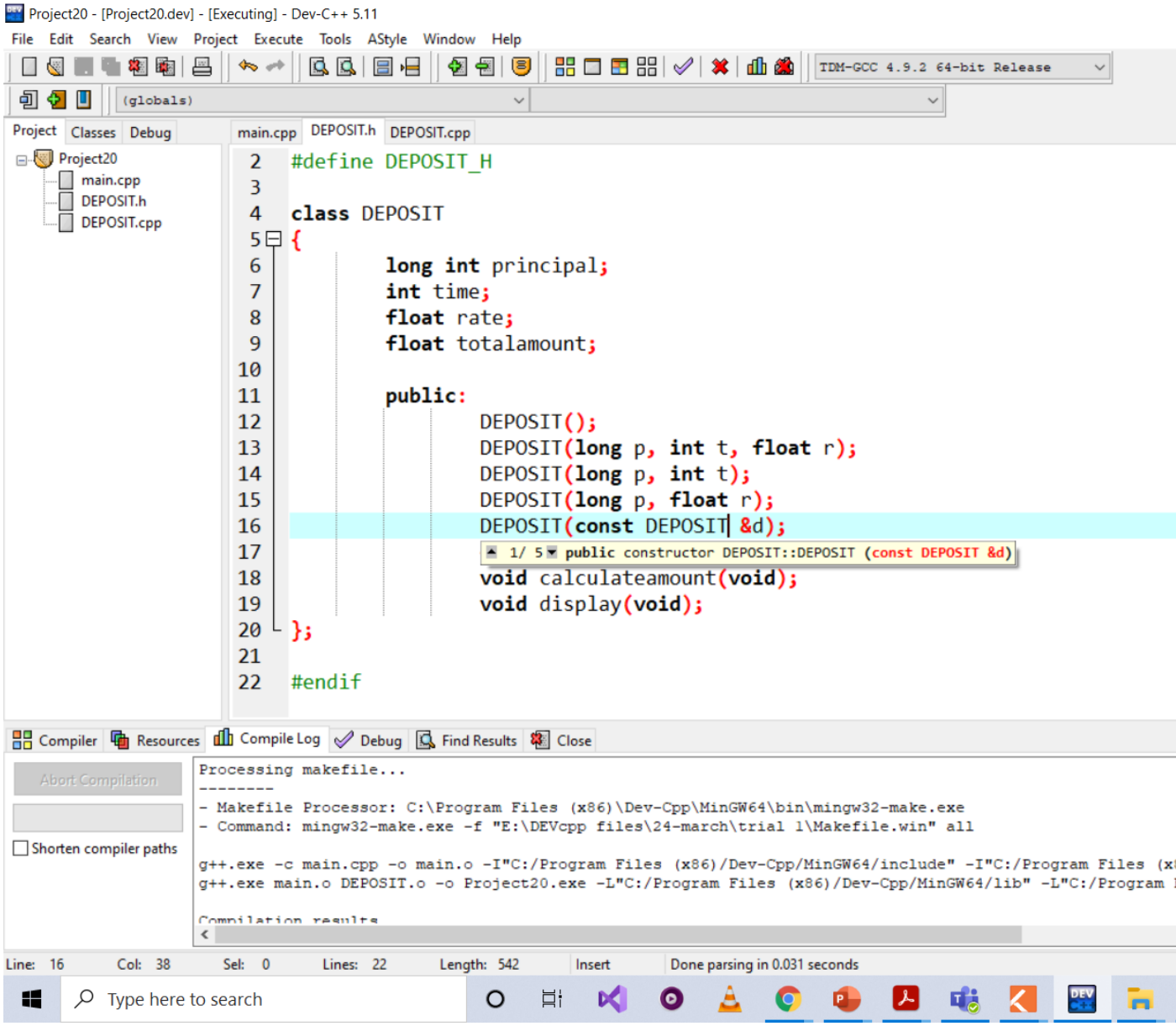
```
        void calculateamount(void);
        void display(void);
};

#endif
```

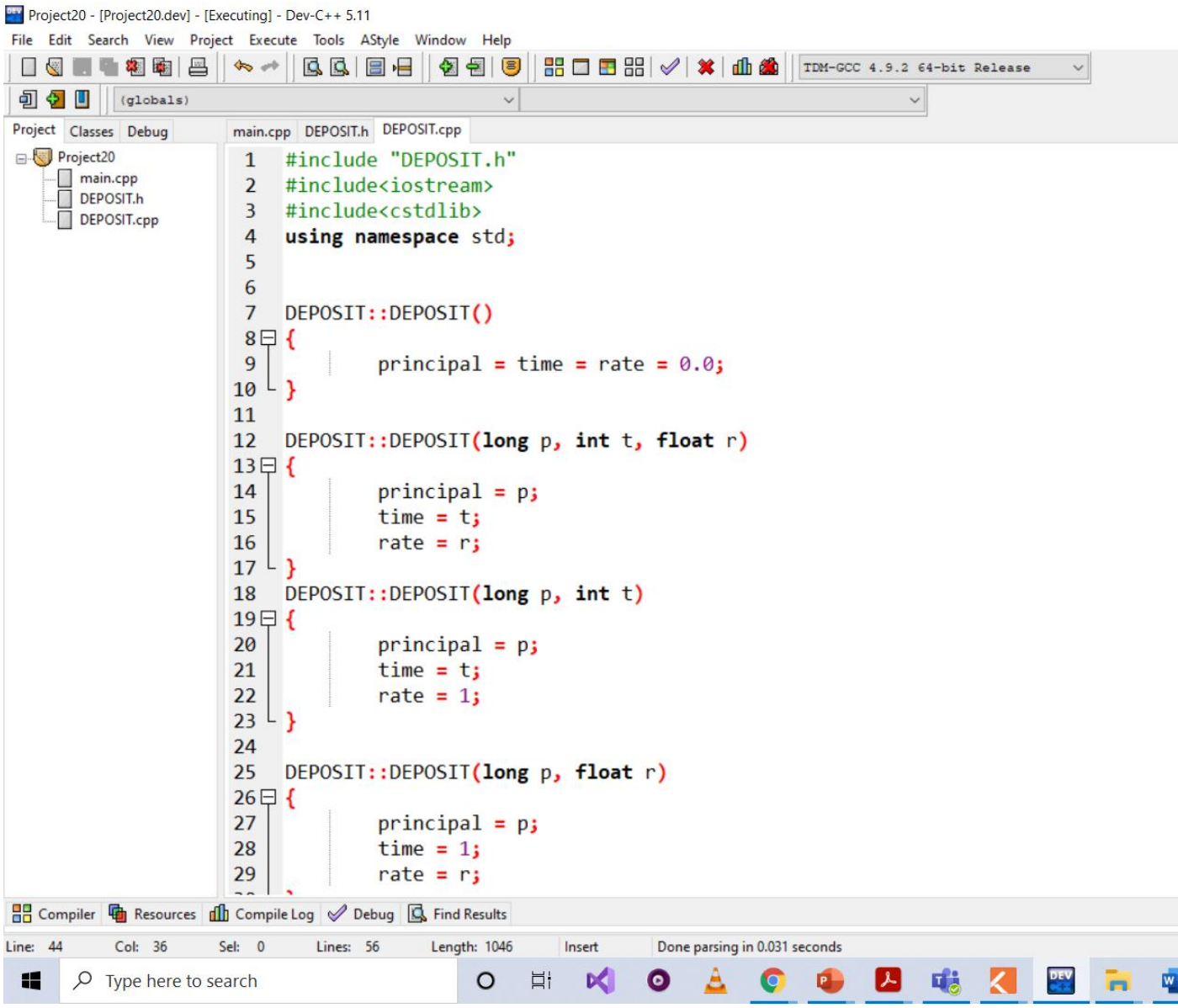
**DEPOSIT.cpp**

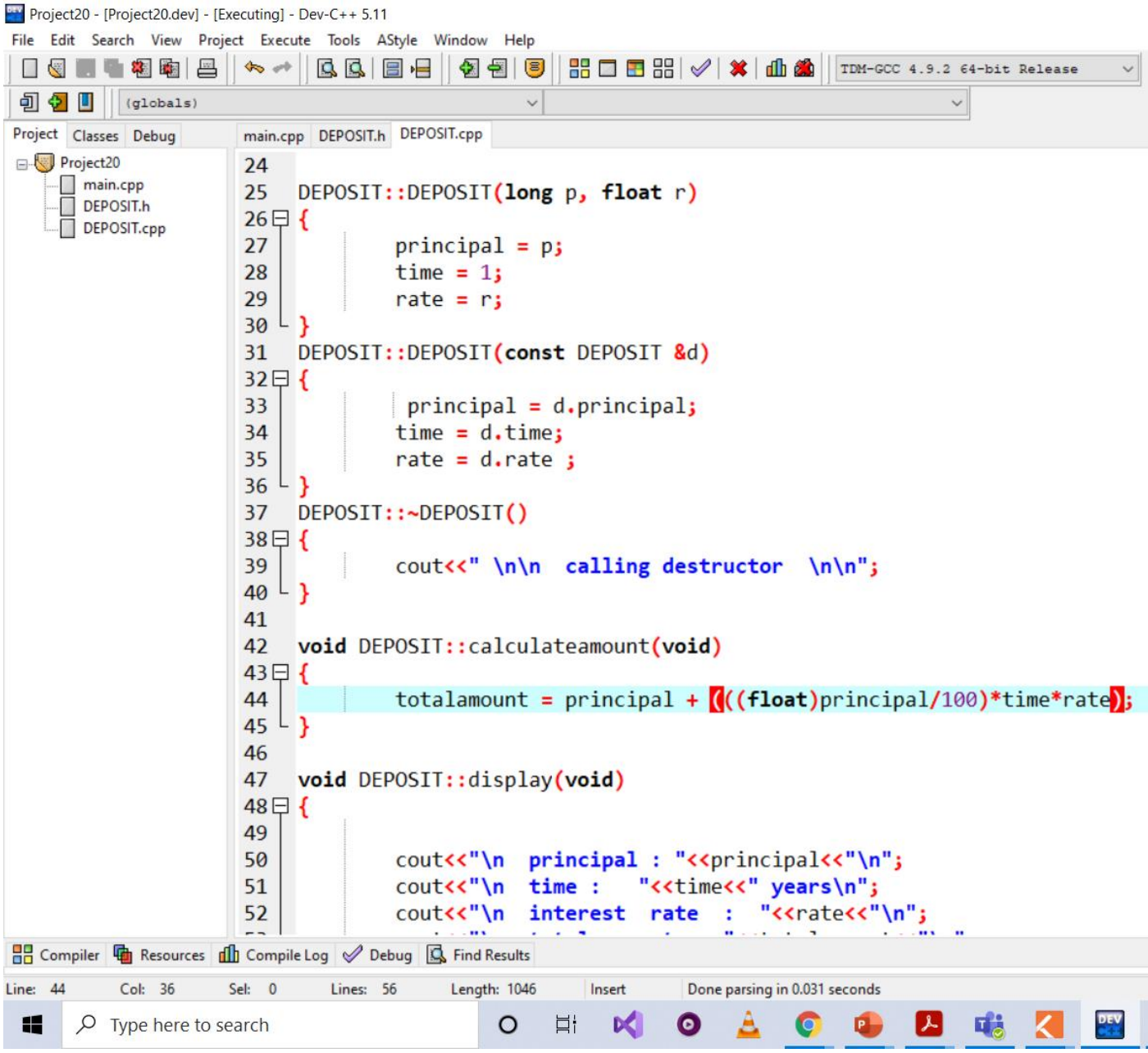
```
#include "DEPOSIT.h"
#include<iostream>
#include<cstdlib>
using namespace std;


DEPOSIT::DEPOSIT()
{
    principal = time = rate = 0.0;
}

DEPOSIT::DEPOSIT(long p, int t, float r)
{
    principal = p;
    time = t;
    rate = r;
}
DEPOSIT::DEPOSIT(long p, int t)
{
    principal = p;
    time = t;
    rate = 1;
```

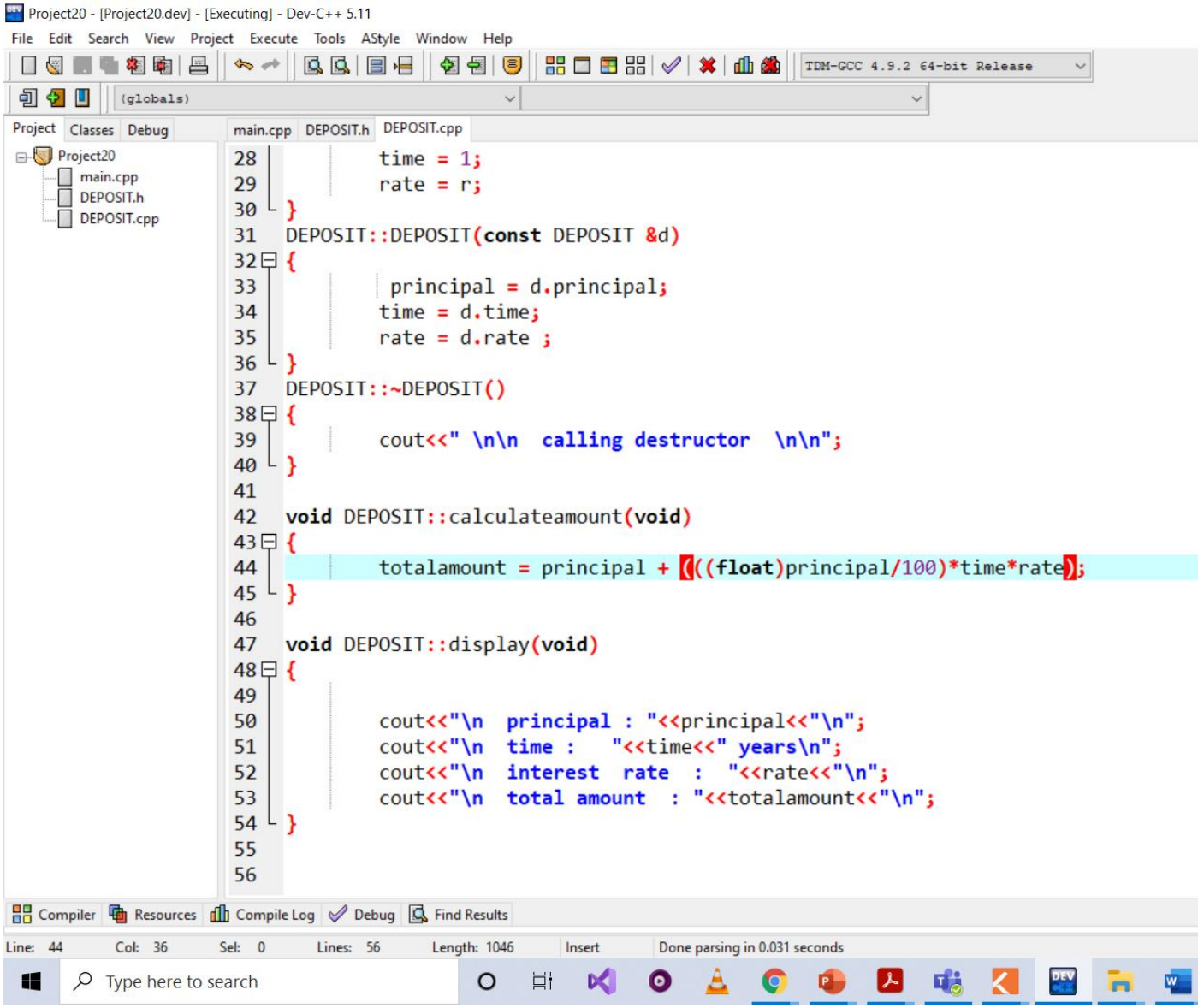
```
}

DEPOSIT::DEPOSIT(long p, float r)
{
	principal = p;
	time = 1;
	rate = r;
}
DEPOSIT::DEPOSIT(const DEPOSIT &d)
{
		principal = d.principal;
	time = d.time;
	rate = d.rate ;
}
DEPOSIT::~DEPOSIT()
{
	cout<<" \n\n  calling destructor  \n\n";
}

void DEPOSIT::calculateamount(void)
{
	totalamount = principal + (((float)principal/100)*time*rate);
}

void DEPOSIT::display(void)
{

		cout<<"\n  principal : "<<principal<<"\n";
	cout<<"\n  time :   "<<time<<" years\n";
```

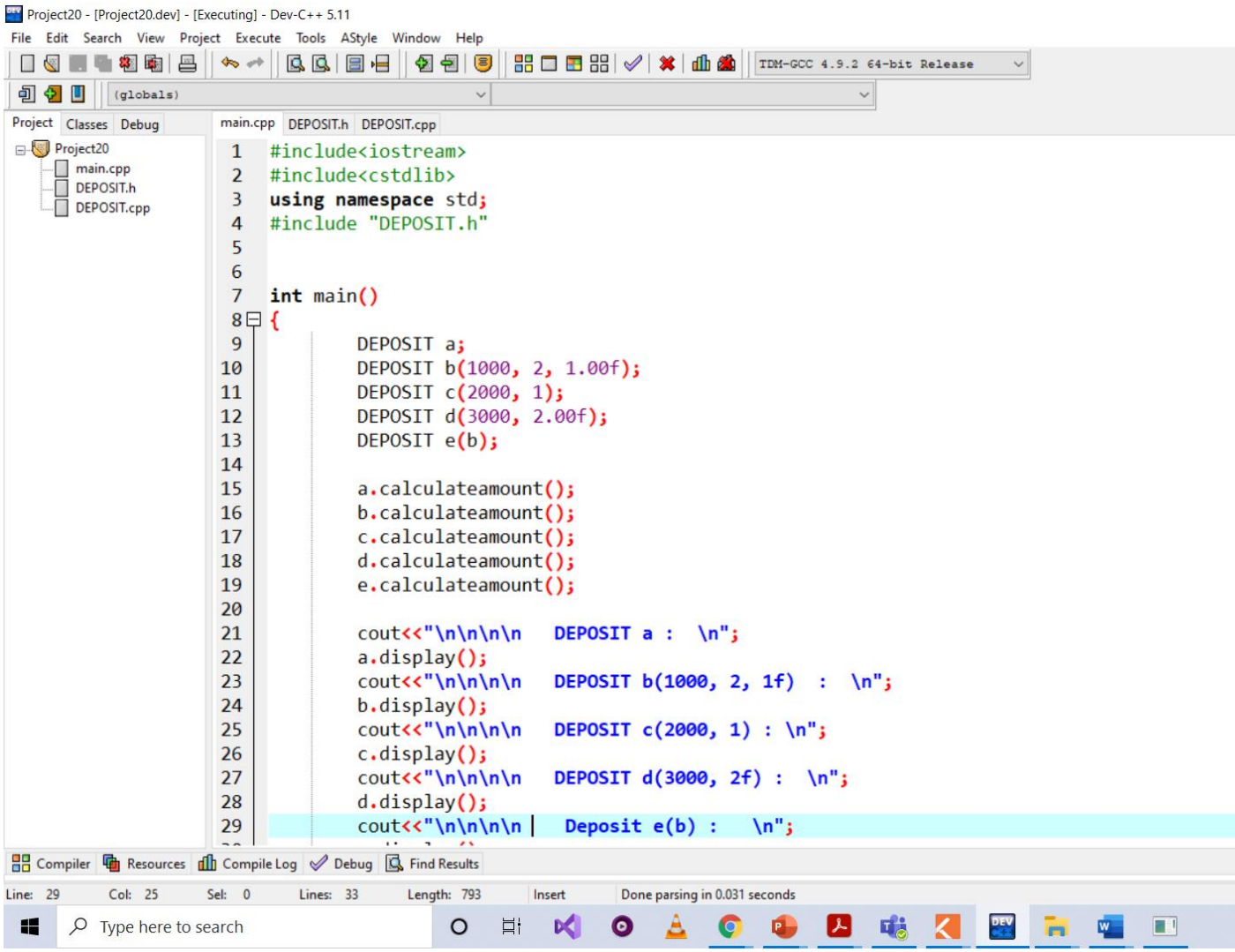
```
    cout<<"\n  interest  rate  :  "<<rate<<"\n";
    cout<<"\n  total amount  : "<<totalamount<<"\n";
}
```

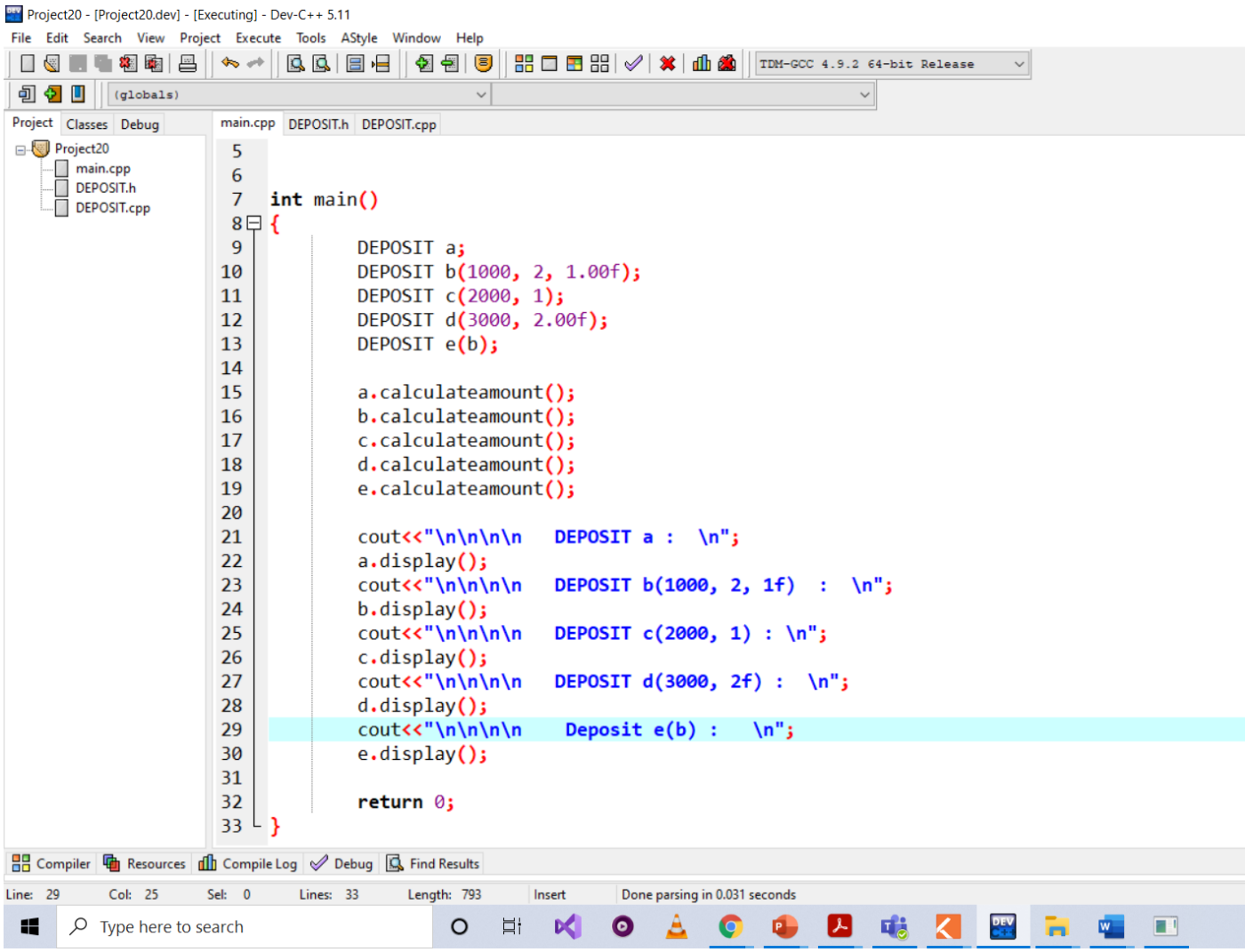

Project20 - [Project20.dev] - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
Project20
main.cpp
DEPOSIT.h
DEPOSIT.cpp
main.cpp DEPOSIT.h DEPOSIT.cpp
2 #define DEPOSIT_H
3
4 class DEPOSIT
5 {
6 long int principal;
7 int time;
8 float rate;
9 float totalamount;
10
11 public:
12 DEPOSIT();
13 DEPOSIT(long p, int t, float r);
14 DEPOSIT(long p, int t);
15 DEPOSIT(long p, float r);
16 DEPOSIT(const DEPOSIT &d);
17 1/ 5 public constructor DEPOSIT::DEPOSIT (const DEPOSIT &d)
18 void calculateamount(void);
19 void display(void);
20 };
21
22 #endif
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Processing makefile...
---
- Makefile Processor: C:\Program Files (x86)\Dev-Cpp\MinGW64\bin\mingw32-make.exe
- Command: mingw32-make.exe -f "E:\DEVcpp files\24-march\trial 1\Makefile.win" all
g++.exe -c main.cpp -o main.o -I"C:/Program Files (x86)/Dev-Cpp/MinGW64/include" -I"C:/Program Files (x
g++.exe main.o DEPOSIT.o -o Project20.exe -L"C:/Program Files (x86)/Dev-Cpp/MinGW64/lib" -L"C:/Program
Compilation results
Line: 16 Col: 38 Sel: 0 Lines: 22 Length: 542 Insert Done parsing in 0.031 seconds
Type here to search


Project20 - [Project20.dev] - [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
Project20
main.cpp
DEPOSIT.h
DEPOSIT.cpp
main.cpp DEPOSIT.h DEPOSIT.cpp
#include "DEPOSIT.h"
#include<iostream>
#include<cstdlib>
using namespace std;
DEPOSIT::DEPOSIT()
{
principal = time = rate = 0.0;
}
DEPOSIT::DEPOSIT(long p, int t, float r)
{
principal = p;
time = t;
rate = r;
}
DEPOSIT::DEPOSIT(long p, int t)
{
principal = p;
time = t;
rate = 1;
}
DEPOSIT::DEPOSIT(long p, float r)
{
principal = p;
time = 1;
rate = r;
Compiler Resources Compile Log Debug Find Results
Line: 44 Col: 36 Sel: 0 Lines: 56 Length: 1046 Insert Done parsing in 0.031 seconds
Type here to search


Project20 - [Project20.dev] - [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
Project20
main.cpp
DEPOSIT.h
DEPOSIT.cpp
main.cpp DEPOSIT.h DEPOSIT.cpp
24
25 DEPOSIT::DEPOSIT(long p, float r)
26 {
27 principal = p;
28 time = 1;
29 rate = r;
30 }
31 DEPOSIT::DEPOSIT(const DEPOSIT &d)
32 {
33 principal = d.principal;
34 time = d.time;
35 rate = d.rate ;
36 }
37 DEPOSIT::~DEPOSIT()
38 {
39 cout<<" \n\n calling destructor \n\n";
40 }
41
42 void DEPOSIT::calculateamount(void)
43 {
44 totalamount = principal + (((float)principal/100)*time*rate);
45 }
46
47 void DEPOSIT::display(void)
48 {
49
50 cout<<"\n principal : "<<principal<<"\n";
51 cout<<"\n time : "<<time<<" years\n";
52 cout<<"\n interest rate : "<<rate<<"\n";
Compiler Resources Compile Log Debug Find Results
Line: 44 Col: 36 Sel: 0 Lines: 56 Length: 1046 Insert Done parsing in 0.031 seconds
Type here to search


Project20 - [Project20.dev] - [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
Project20
main.cpp
DEPOSIT.h
DEPOSIT.cpp
main.cpp DEPOSIT.h DEPOSIT.cpp
28 time = 1;
29 rate = r;
30 }
31 DEPOSIT::DEPOSIT(const DEPOSIT &d)
32 {
33 principal = d.principal;
34 time = d.time;
35 rate = d.rate ;
36 }
37 DEPOSIT::~DEPOSIT()
38 {
39 cout<<" \n\n calling destructor \n\n";
40 }
41
42 void DEPOSIT::calculateamount(void)
43 {
44 totalamount = principal + (((float)principal/100)*time*rate);
45 }
46
47 void DEPOSIT::display(void)
48 {
49
50 cout<<"\n principal : "<<principal<<"\n";
51 cout<<"\n time : "<<time<<" years\n";
52 cout<<"\n interest rate : "<<rate<<"\n";
53 cout<<"\n total amount : "<<totalamount<<"\n";
54 }
55
56
Compiler Resources Compile Log Debug Find Results
Line: 44 Col: 36 Sel: 0 Lines: 56 Length: 1046 Insert Done parsing in 0.031 seconds
Type here to search


Project20 - [Project20.dev] - [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
Project20
main.cpp
DEPOSIT.h
DEPOSIT.cpp
main.cpp DEPOSIT.h DEPOSIT.cpp
#include<iostream>
#include<cstdlib>
using namespace std;
#include "DEPOSIT.h"
int main()
{
DEPOSIT a;
DEPOSIT b(1000, 2, 1.00f);
DEPOSIT c(2000, 1);
DEPOSIT d(3000, 2.00f);
DEPOSIT e(b);
a.calculateamount();
b.calculateamount();
c.calculateamount();
d.calculateamount();
e.calculateamount();
cout<<"\n\n\n\n DEPOSIT a : \n";
a.display();
cout<<"\n\n\n\n DEPOSIT b(1000, 2, 1f) : \n";
b.display();
cout<<"\n\n\n\n DEPOSIT c(2000, 1) : \n";
c.display();
cout<<"\n\n\n\n DEPOSIT d(3000, 2f) : \n";
d.display();
cout<<"\n\n\n\n Deposit e(b) : \n";
Compiler Resources Compile Log Debug Find Results
Line: 29 Col: 25 Sel: 0 Lines: 33 Length: 793 Insert Done parsing in 0.031 seconds
Type here to search


Project20 - [Project20.dev] - [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
Project20
main.cpp
DEPOSIT.h
DEPOSIT.cpp
main.cpp DEPOSIT.h DEPOSIT.cpp
int main()
{
DEPOSIT a;
DEPOSIT b(1000, 2, 1.00f);
DEPOSIT c(2000, 1);
DEPOSIT d(3000, 2.00f);
DEPOSIT e(b);
a.calculateamount();
b.calculateamount();
c.calculateamount();
d.calculateamount();
e.calculateamount();
cout<<"\n\n\n\n DEPOSIT a : \n";
a.display();
cout<<"\n\n\n\n DEPOSIT b(1000, 2, 1f) : \n";
b.display();
cout<<"\n\n\n\n DEPOSIT c(2000, 1) : \n";
c.display();
cout<<"\n\n\n\n DEPOSIT d(3000, 2f) : \n";
d.display();
cout<<"\n\n\n\n Deposit e(b) : \n";
e.display();
return 0;
}
Compiler Resources Compile Log Debug Find Results
Line: 29 Col: 25 Sel: 0 Lines: 33 Length: 793 Insert Done parsing in 0.031 seconds
Type here to search

E:\DEVcpp files\24-march\trial 1\Project20.exe

```
 DEPOSIT a :
principal : 0
time :   0 years
interest  rate  :  0
total amount  : 0


 DEPOSIT b(1000, 2, 1f)  :
principal : 1000
time :   2 years
interest  rate  :  1
total amount  : 1020


 DEPOSIT c(2000, 1) :
principal : 2000
time :   1 years
interest  rate  :  1
total amount  : 2020


 DEPOSIT d(3000, 2f) :
principal : 3000
time :   1 years
interest  rate  :  2
```

E:\DEVcpp files\24-march\trial 1\Project20.exe

```
 DEPOSIT d(3000, 2f) :
principal : 3000
time :   1 years
interest  rate  :  2
total amount  : 3060


  Deposit e(b) :
principal : 1000
time :   2 years
interest  rate  :  1
total amount  : 1020

calling destructor


calling destructor


calling destructor


calling destructor


calling destructor


--------------------------------
Process exited after 1.302 seconds with return value 0
Press any key to continue . . .
```

**Question 9:**

**A program to demonstrate the concept of returning objects from a function**

```
#include<iostream.h>
class weight
{
int kilogram;
int gram;
public:
void getdata ();
void putdata ();
void sum_weight (weight,weight) ; weight sum_weight (weight) ;
} ;
```

## main.cpp

```
#include<iostream>
using namespace std;
#include "weight.h"

int main()
{
        weight w1,w2,w3;
        cout<<" \n\n\n for w1: ";
        w1.getdata();
        cout<<" \n\n\n for w2: ";
        w2.getdata();cout<<" \n\n\n  w3.sum_weight(w1,w2) will add weights of w1,w2 and
assign it to w3 \n\n";
        w3.sum_weight(w1,w2);cout<<"\n   w3: \n ";w3.putdata();
        cout<<"\n\n\n w1.sum_weight(w2).putdata() will add weight of w2 to w1 and
display it\n    ";
```

```
        w1.sum_weight(w2).putdata();




        return 0;
}
```

**weight.h**

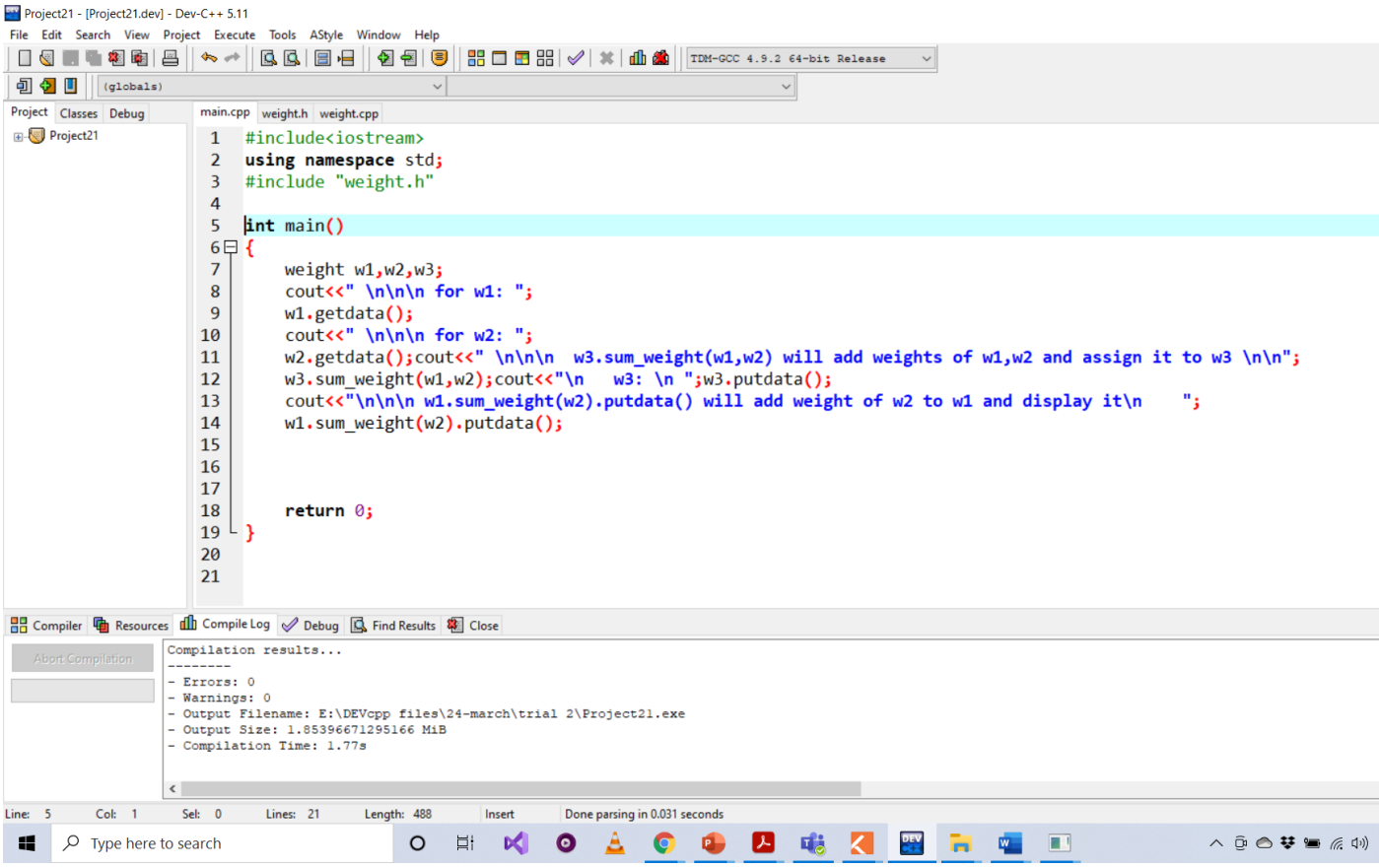
```
#ifndef WEIGHT_H
#define WEIGHT_H

class weight
{
int kilogram;
int gram;
public:
void getdata ();
void putdata ();
void sum_weight (weight,weight) ; weight sum_weight (weight) ;
friend void reduce(weight &);
} ;
#endif
```

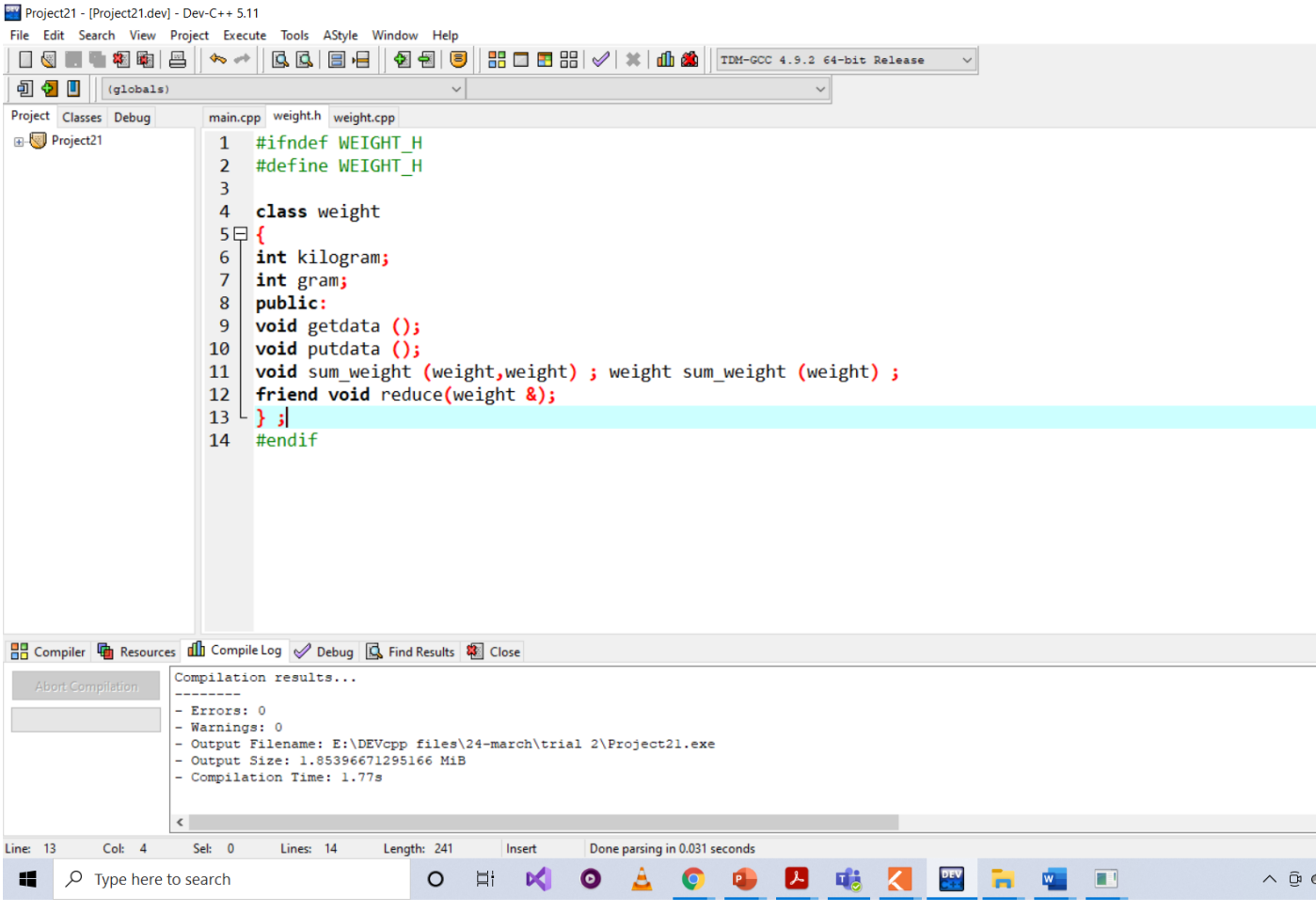
**weight.cpp**

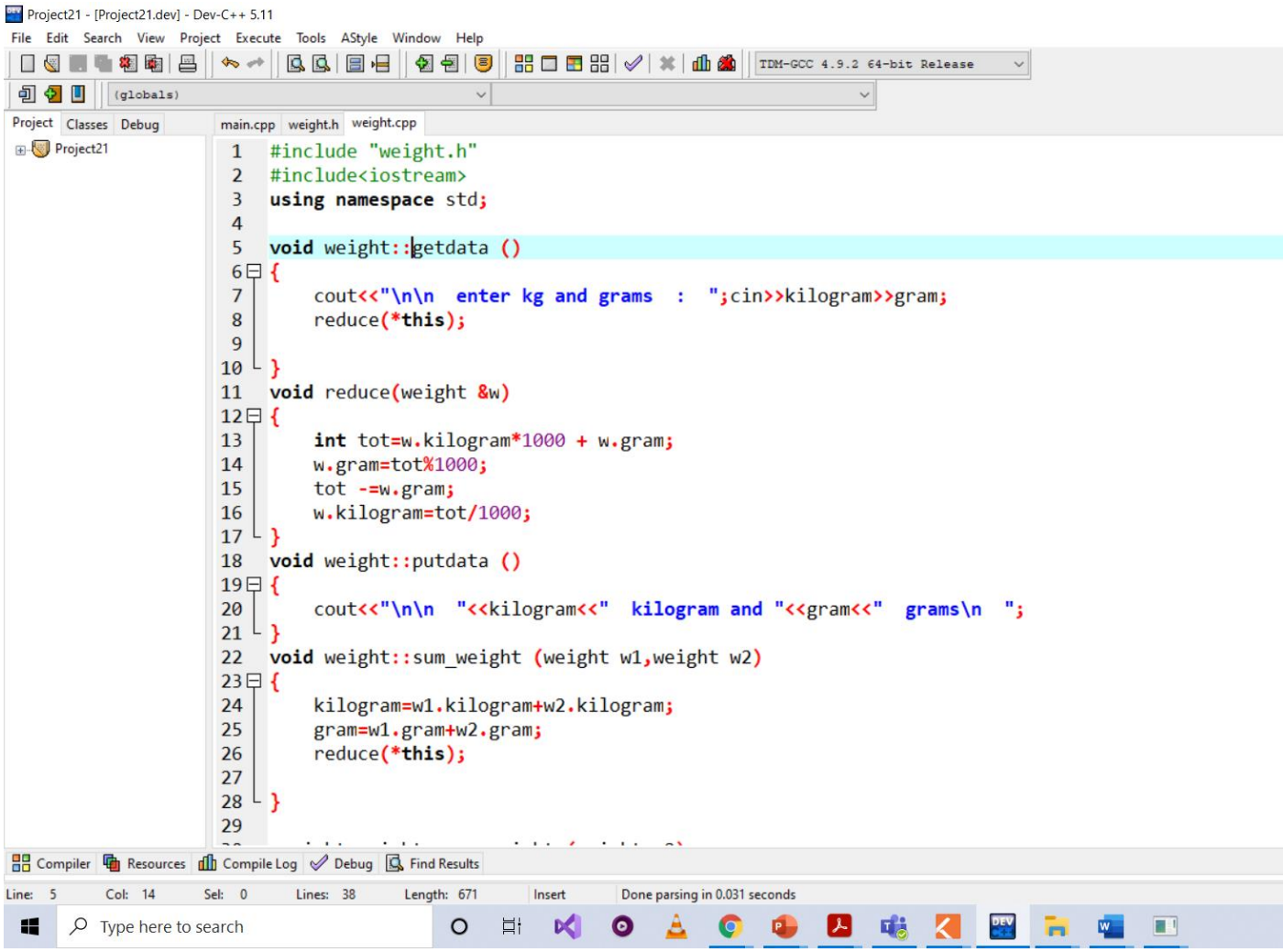
```
#include "weight.h"
#include<iostream>
using namespace std;
```

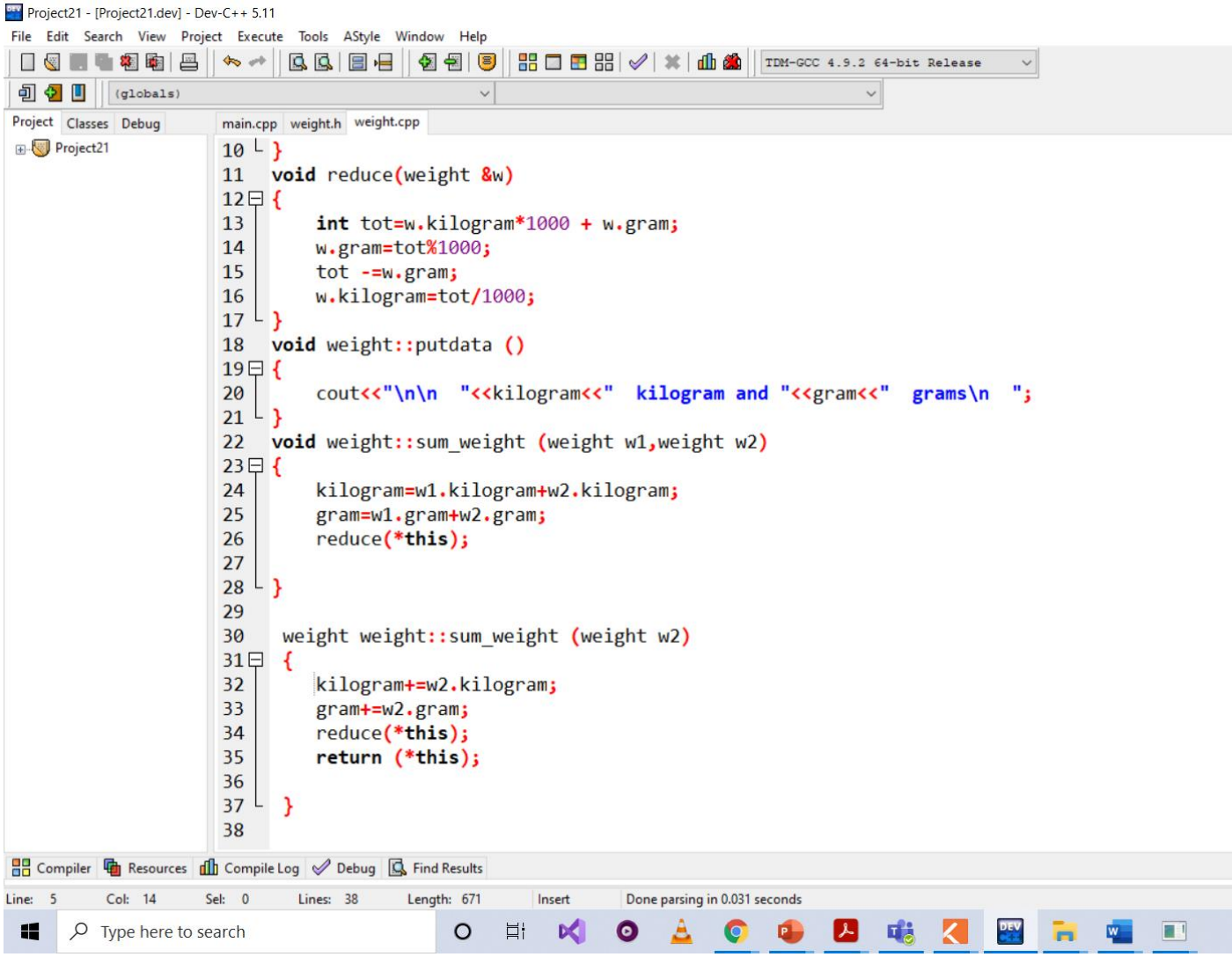
```
void weight::getdata ()
{
        cout<<"\n\n  enter kg and grams  :  ";cin>>kilogram>>gram;
        reduce(*this);

}
void reduce(weight &w)
{
        int tot=w.kilogram*1000 + w.gram;
        w.gram=tot%1000;
        tot -=w.gram;
        w.kilogram=tot/1000;
}
void weight::putdata ()
{
        cout<<"\n\n  "<<kilogram<<"  kilogram and "<<gram<<"  grams\n  ";
}
void weight::sum_weight (weight w1,weight w2)
{
        kilogram=w1.kilogram+w2.kilogram;
        gram=w1.gram+w2.gram;
        reduce(*this);

}

 weight weight::sum_weight (weight w2)
```

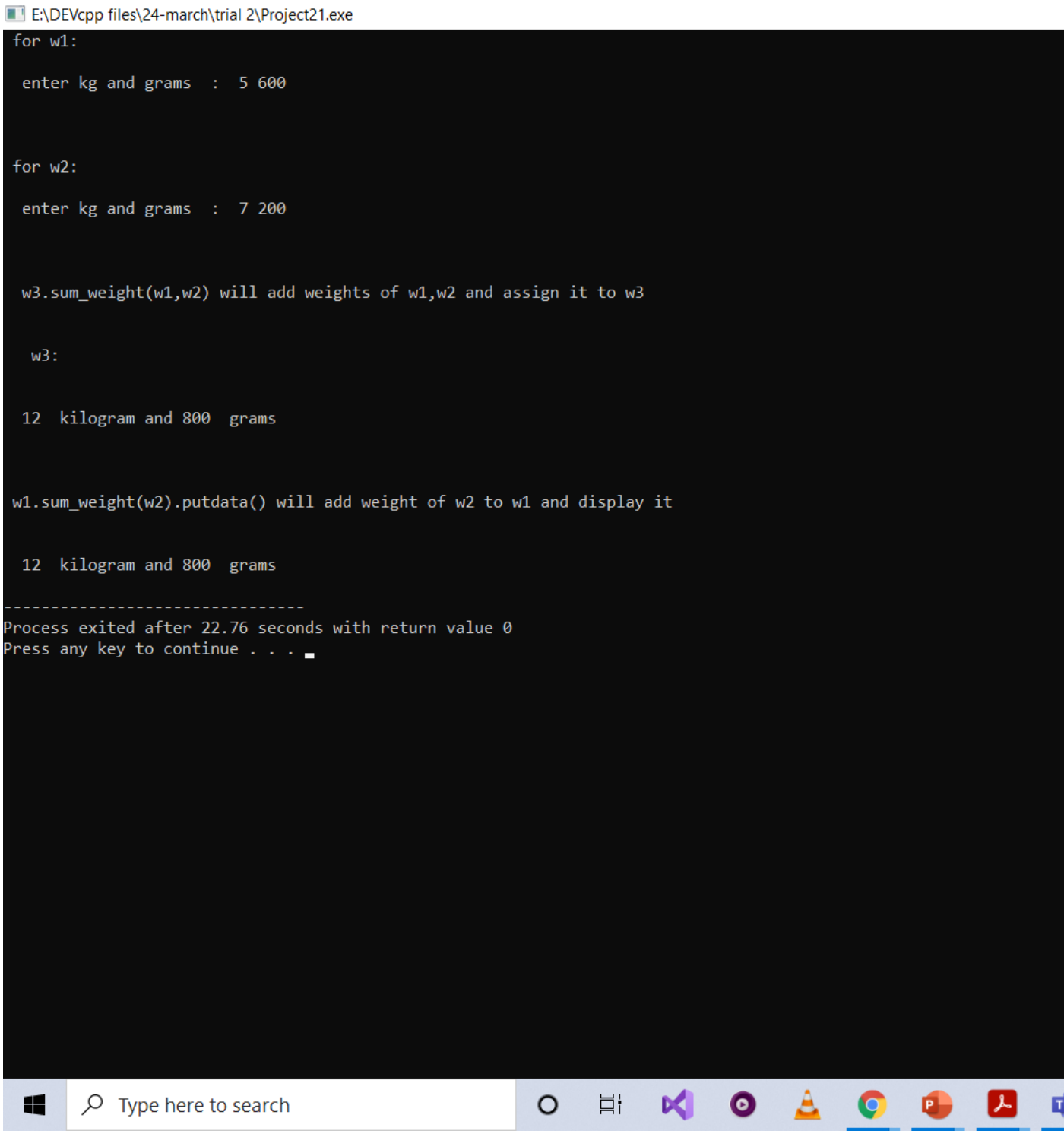
```
{
        kilogram+=w2.kilogram;
        gram+=w2.gram;
        reduce(*this);
        return (*this);

}
```


Project21 - [Project21.dev] - 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
Project21
main.cpp weight.h weight.cpp
#include<iostream>
using namespace std;
#include "weight.h"
int main()
{
weight w1,w2,w3;
cout<<" \n\n\n for w1: ";
w1.getdata();
cout<<" \n\n\n for w2: ";
w2.getdata();cout<<" \n\n\n w3.sum_weight(w1,w2) will add weights of w1,w2 and assign it to w3 \n\n";
w3.sum_weight(w1,w2);cout<<"\n w3: \n ";w3.putdata();
cout<<"\n\n\n w1.sum_weight(w2).putdata() will add weight of w2 to w1 and display it\n ";
w1.sum_weight(w2).putdata();
return 0;
}
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: E:\DEVcpp files\24-march\trial 2\Project21.exe
- Output Size: 1.85396671295166 MiB
- Compilation Time: 1.77s
Line: 5 Col: 1 Sel: 0 Lines: 21 Length: 488 Insert Done parsing in 0.031 seconds
Type here to search


Project21 - [Project21.dev] - 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
Project21
main.cpp weight.h weight.cpp
#ifndef WEIGHT_H
#define WEIGHT_H
class weight
{
int kilogram;
int gram;
public:
void getdata ();
void putdata ();
void sum_weight (weight,weight) ; weight sum_weight (weight) ;
friend void reduce(weight &);
} ;
#endif
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: E:\DEVcpp files\24-march\trial 2\Project21.exe
- Output Size: 1.85396671295166 MiB
- Compilation Time: 1.77s
Line: 13 Col: 4 Sel: 0 Lines: 14 Length: 241 Insert Done parsing in 0.031 seconds
Type here to search


Project21 - [Project21.dev] - 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
Project21
main.cpp weight.h weight.cpp
#include "weight.h"
#include<iostream>
using namespace std;
void weight::getdata ()
{
cout<<"\n\n enter kg and grams : ";cin>>kilogram>>gram;
reduce(*this);
}
void reduce(weight &w)
{
int tot=w.kilogram*1000 + w.gram;
w.gram=tot%1000;
tot -=w.gram;
w.kilogram=tot/1000;
}
void weight::putdata ()
{
cout<<"\n\n "<<kilogram<<" kilogram and "<<gram<<" grams\n ";
}
void weight::sum_weight (weight w1,weight w2)
{
kilogram=w1.kilogram+w2.kilogram;
gram=w1.gram+w2.gram;
reduce(*this);
}
Compiler Resources Compile Log Debug Find Results
Line: 5 Col: 14 Sel: 0 Lines: 38 Length: 671 Insert Done parsing in 0.031 seconds
Type here to search


Project21 - [Project21.dev] - 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
Project21
main.cpp weight.h weight.cpp
10 }
11 void reduce(weight &w)
12 {
13 int tot=w.kilogram*1000 + w.gram;
14 w.gram=tot%1000;
15 tot -=w.gram;
16 w.kilogram=tot/1000;
17 }
18 void weight::putdata ()
19 {
20 cout<<"\n\n "<<kilogram<<" kilogram and "<<gram<<" grams\n ";
21 }
22 void weight::sum_weight (weight w1,weight w2)
23 {
24 kilogram=w1.kilogram+w2.kilogram;
25 gram=w1.gram+w2.gram;
26 reduce(*this);
27
28 }
29
30 weight weight::sum_weight (weight w2)
31 {
32 kilogram+=w2.kilogram;
33 gram+=w2.gram;
34 reduce(*this);
35 return (*this);
36
37 }
38
Compiler Resources Compile Log Debug Find Results
Line: 5 Col: 14 Sel: 0 Lines: 38 Length: 671 Insert Done parsing in 0.031 seconds
Type here to search


E:\DEVcpp files\24-march\trial 2\Project21.exe
for w1:
enter kg and grams : 5 600
for w2:
enter kg and grams : 7 200
w3.sum_weight(w1,w2) will add weights of w1,w2 and assign it to w3
w3:
12 kilogram and 800 grams
w1.sum_weight(w2).putdata() will add weight of w2 to w1 and display it
12 kilogram and 800 grams
Process exited after 22.76 seconds with return value 0
Press any key to continue . . .
Type here to search