C_143 ⇒ Types of Storage classes in C.

Part-3 - Static Storage classes

* 'Static' storage class is the most important, asked in many interviews.

* How to use it?

Default Values.

```
static int a;          → 0
static char str[20];   → null
static char ch;        → null
static float x;        → 0.000000
```

* Default value for static storage class variables will be 0 not garbage value

* ~~register~~ static storage class variables will be stored inside main memory of RAM.

NOTE:

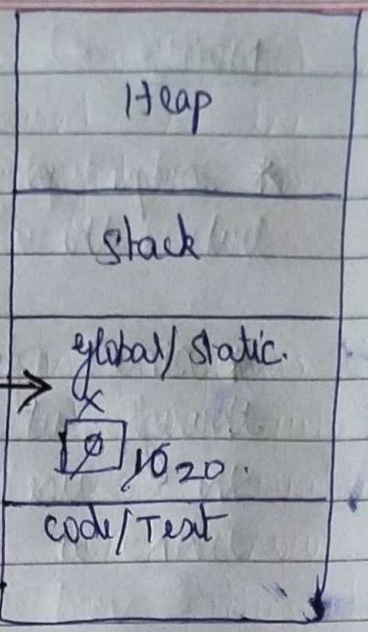
* May be you think scope and lifetime of variables is same but it is different from each other.

* scope of static storage class variables will be within the block or method ape (local and global declaration; both allowed)

* Lifetime of the static storage class variables will be alive throughout the program; it will be dead only after exit of the program.

Example: (lifetime)

```
void display();
void main()
{
    display();
    display();
}
void display()
{
    static int x;
    x += 10;
    printf("\n x = %d", x);
}
```



static int x; → Static variables by default initialized with 0

→ since it is static this statement would be skipped since static variable lifetime is throughs the program and it is still alive; so it will retain its previous value.

O/P
x = 10
x = 20

Example: (scope)

```
void display
void main()
{
    display();
    display();
    printf("x = %d", x);
}
```

Error undeclared variable x

```
void display()
{
    static int x;
    x += 10;
    printf("\n x = %d", x);
}
```

Scope of x is only within this function

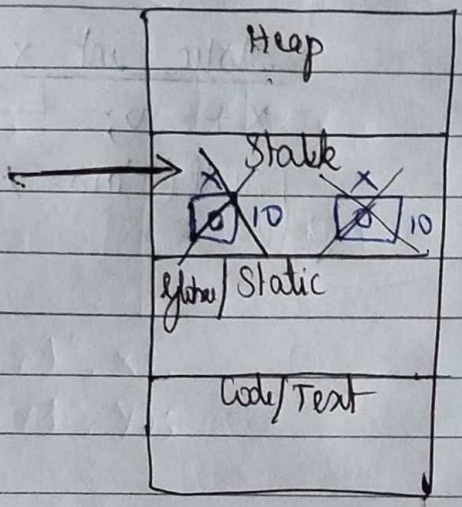
NOTE:

* scope is only within the block or method but the lifetime is valid entire program execution.

* since global and static variables is valid through out the program better minimize the use of these variables; use only when it is necessary.

Example:

```
void display();
void main()
{
  display();
  display();
}
void display()
{
  int x=0;
  x+=10;   // x = x+10;
  printf("\n x=%d", x);
}
```



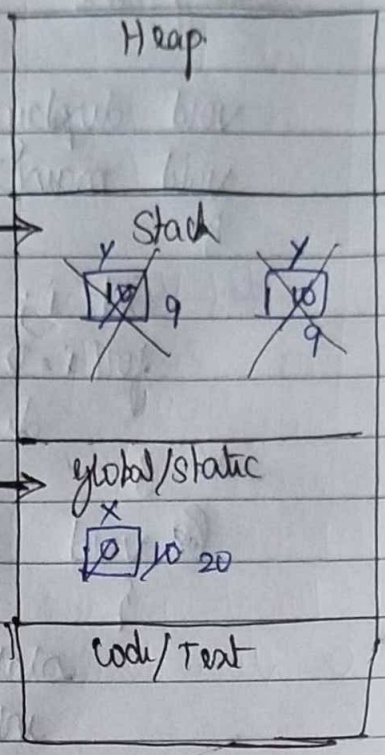
O/P
x = 10
x = 10

* It is auto hence birth of x is again taken place

* If x is static then the birth of x is taken place only one time and next time it will retain its previous value.

Example:

```
void display();
void main()
{
  display();
  display();
}
void display()
{
  static int x;
  int y=10;
  x+=10;
  y--;
  printf("\n x= %d", x);
  printf("\n y= %d", y);
}
```



O/P

x = 10	x = 20
y = 9	y = 9

Example:

```
void display();
static char ch; // static char ch='a';
void main()
{
  display();
  display();
  printf("\n ch = %c", ch);
}
void display()
{
  static int x;
  int y=10;
  x+=10;
  y--;
  printf("\n x= %d", x);
  printf("\n y= %d", y);
}
```

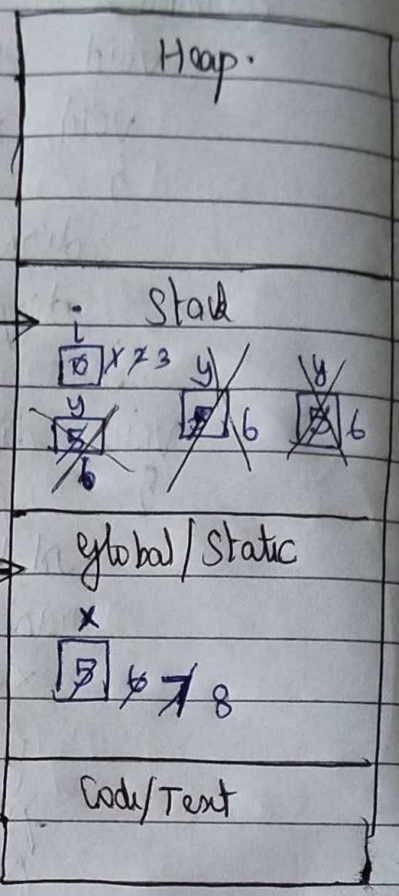
ch is declared global

O/P:

x = 10
y = 9
x = 10
y = 9
ch = 'a'

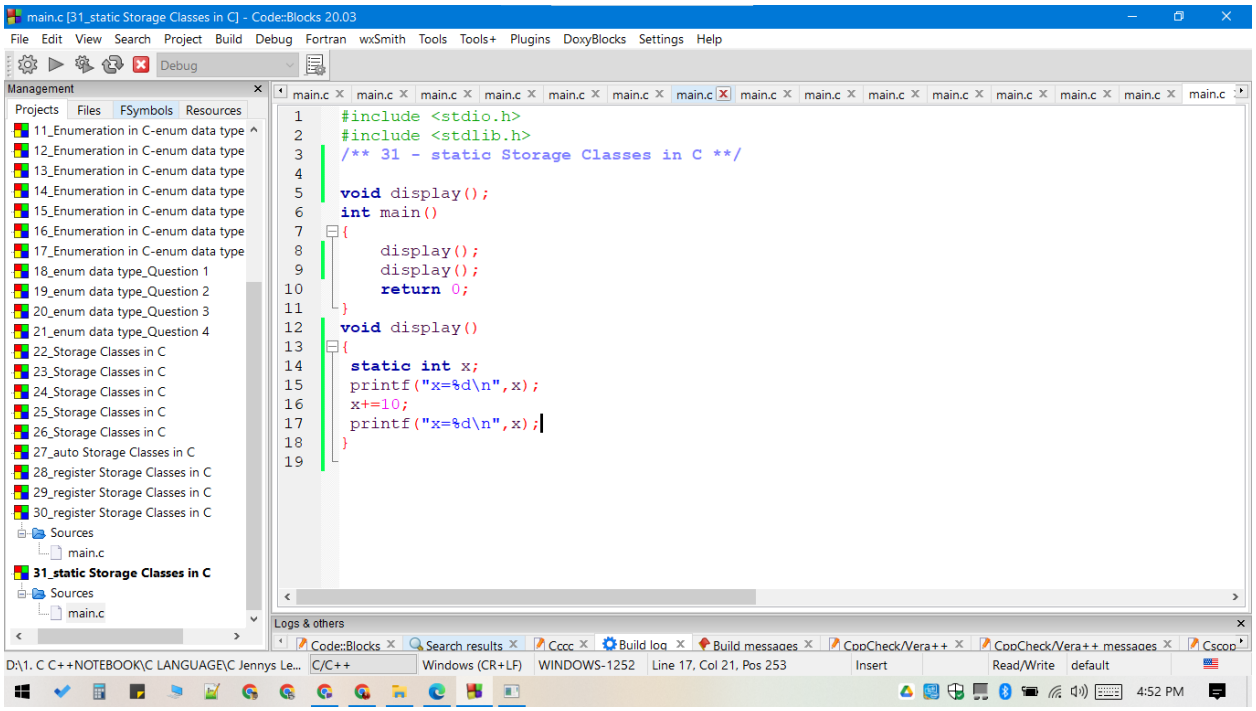
Assignment

```
void display();
void main()
{
    int i;
    for(i=0; i<3; i++)
        display();
}
void display()
{
    static int x=5;
    int y=5;
    x++;
    y++;
    printf("\n x = %d", x);
    printf("\n y = %d", y);
}
```



O/P

x = 6
y = 6
x = 7
y = 6
x = 8
y = 6


main.c [31_static Storage Classes in C] - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
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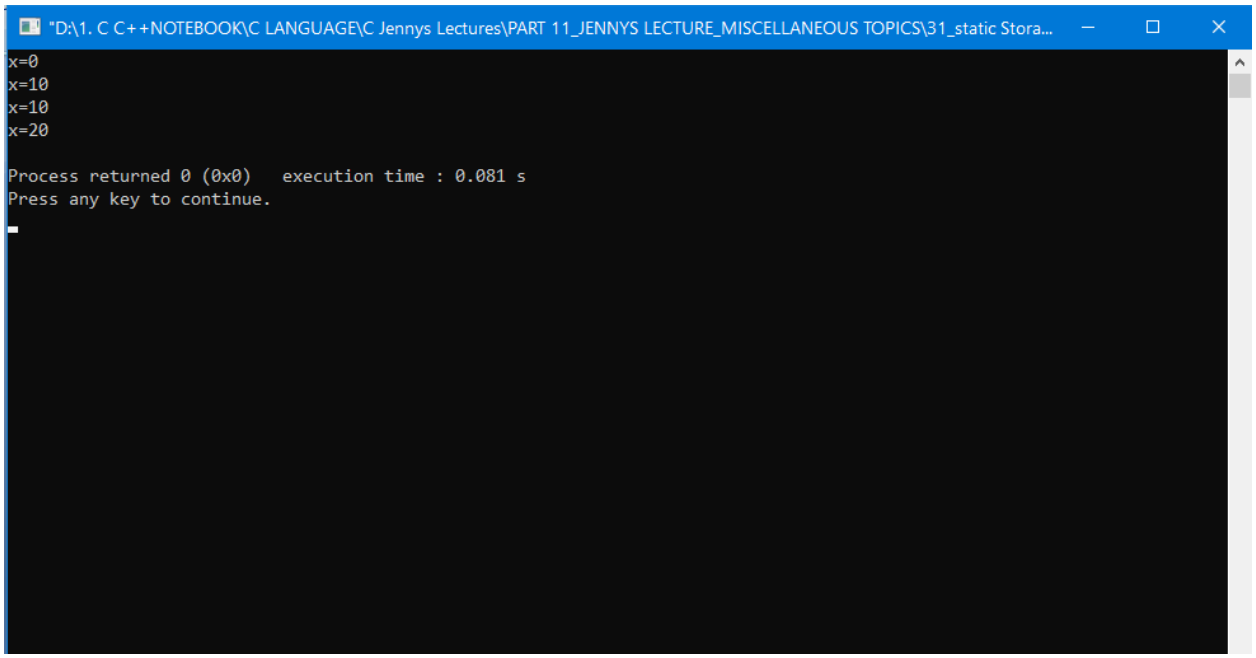
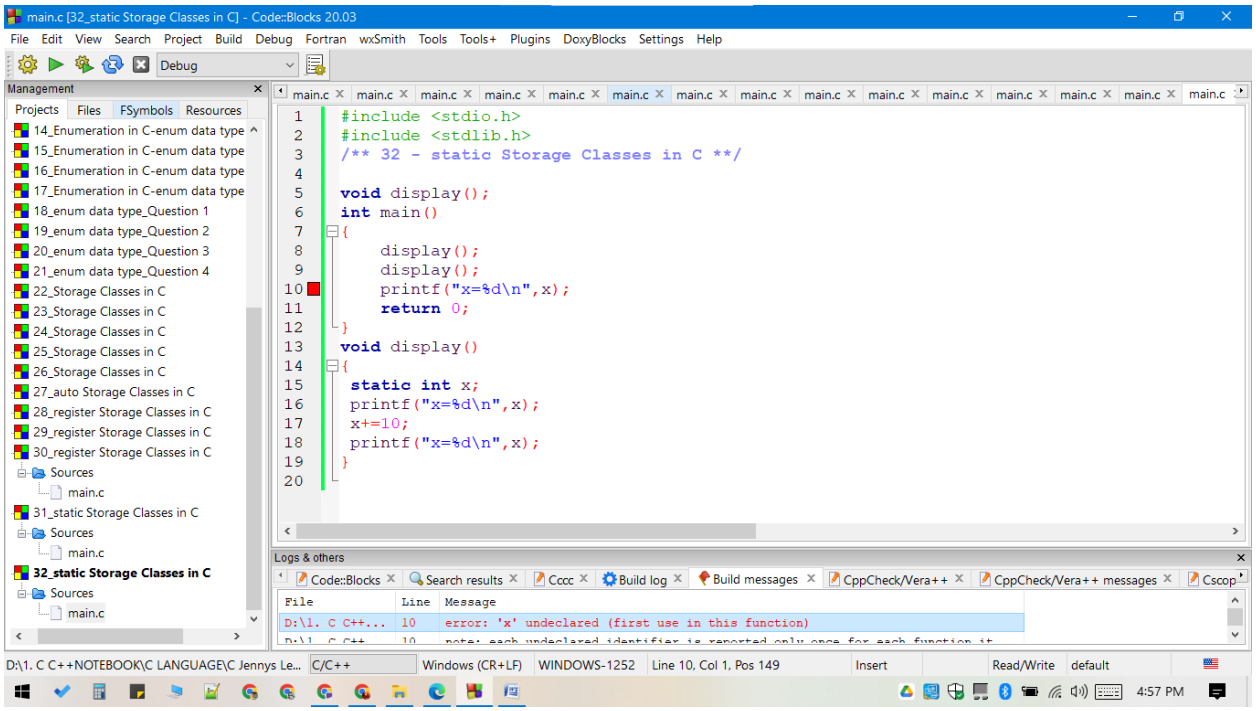
11_Enumeration in C-enum data type
12_Enumeration in C-enum data type
13_Enumeration in C-enum data type
14_Enumeration in C-enum data type
15_Enumeration in C-enum data type
16_Enumeration in C-enum data type
17_Enumeration in C-enum data type
18_enum data type_Question 1
19_enum data type_Question 2
20_enum data type_Question 3
21_enum data type_Question 4
22_Storage Classes in C
23_Storage Classes in C
24_Storage Classes in C
25_Storage Classes in C
26_Storage Classes in C
27_auto Storage Classes in C
28_register Storage Classes in C
29_register Storage Classes in C
30_register Storage Classes in C
Sources
main.c
31_static Storage Classes in C
Sources
main.c
1 #include <stdio.h>
2 #include <stdlib.h>
3 /** 31 - static Storage Classes in C **/
4
5 void display();
6 int main()
7 {
8 display();
9 display();
10 return 0;
11 }
12 void display()
13 {
14 static int x;
15 printf("x=%d\n",x);
16 x+=10;
17 printf("x=%d\n",x);
18 }
19
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscop
D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Le... C/C++ Windows (CR+LF) WINDOWS-1252 Line 17, Col 21, Pos 253 Insert Read/Write default
4:52 PM


"D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Lectures\PART 11_JENNYS LECTURE_MISCELLANEOUS TOPICS\31_static Stora...
x=0
x=10
x=10
x=20
Process returned 0 (0x0) execution time : 0.081 s
Press any key to continue.


main.c [32_static Storage Classes in C] - Code::Blocks 20.03
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14_Enumeration in C-enum data type
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16_Enumeration in C-enum data type
17_Enumeration in C-enum data type
18_enum data type_Question 1
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21_enum data type_Question 4
22_Storage Classes in C
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24_Storage Classes in C
25_Storage Classes in C
26_Storage Classes in C
27_auto Storage Classes in C
28_register Storage Classes in C
29_register Storage Classes in C
30_register Storage Classes in C
Sources
main.c
31_static Storage Classes in C
Sources
main.c
32_static Storage Classes in C
Sources
main.c
1 #include <stdio.h>
2 #include <stdlib.h>
3 /** 32 - static Storage Classes in C **/
4
5 void display();
6 int main()
7 {
8 display();
9 display();
10 printf("x=%d\n",x);
11 return 0;
12 }
13 void display()
14 {
15 static int x;
16 printf("x=%d\n",x);
17 x+=10;
18 printf("x=%d\n",x);
19 }
20
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscop
File Line Message
D:\1. C C++... 10 error: 'x' undeclared (first use in this function)
D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Le... C/C++ Windows (CR+LF) WINDOWS-1252 Line 10, Col 1, Pos 149 Insert Read/Write default
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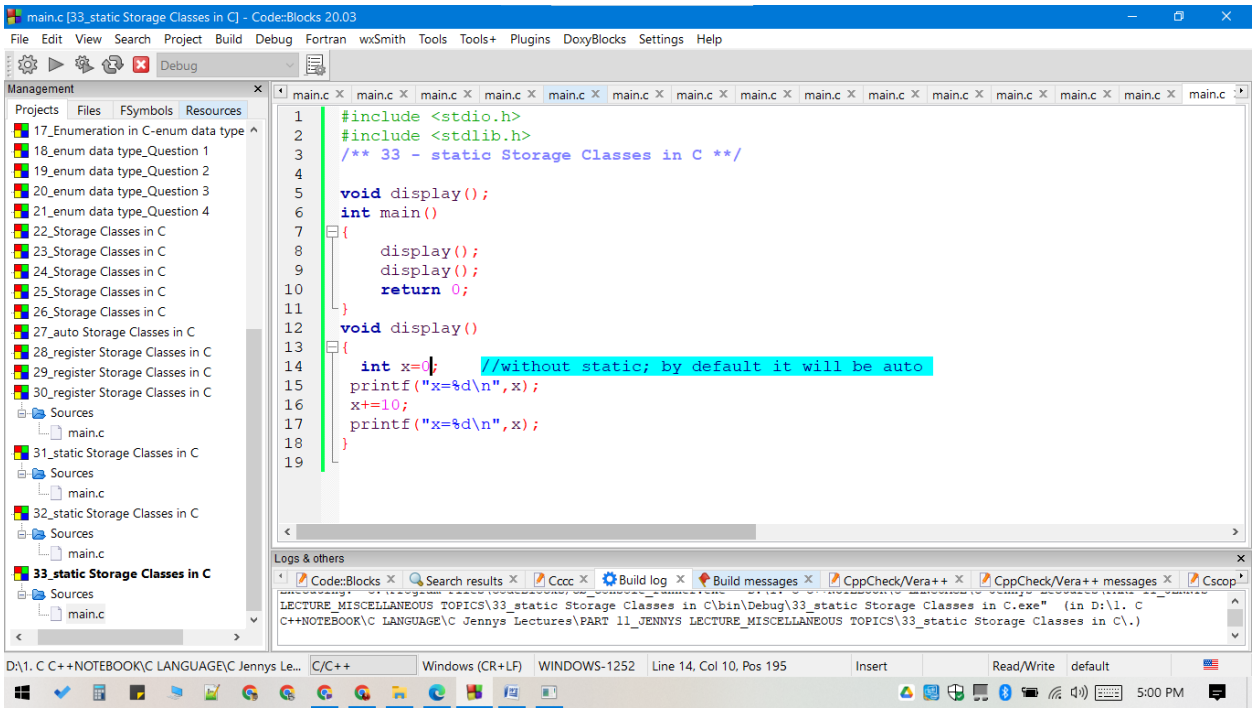
main.c [33_static Storage Classes in C] - Code::Blocks 20.03
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17_Enumeration in C-enum data type
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21_enum data type_Question 4
22_Storage Classes in C
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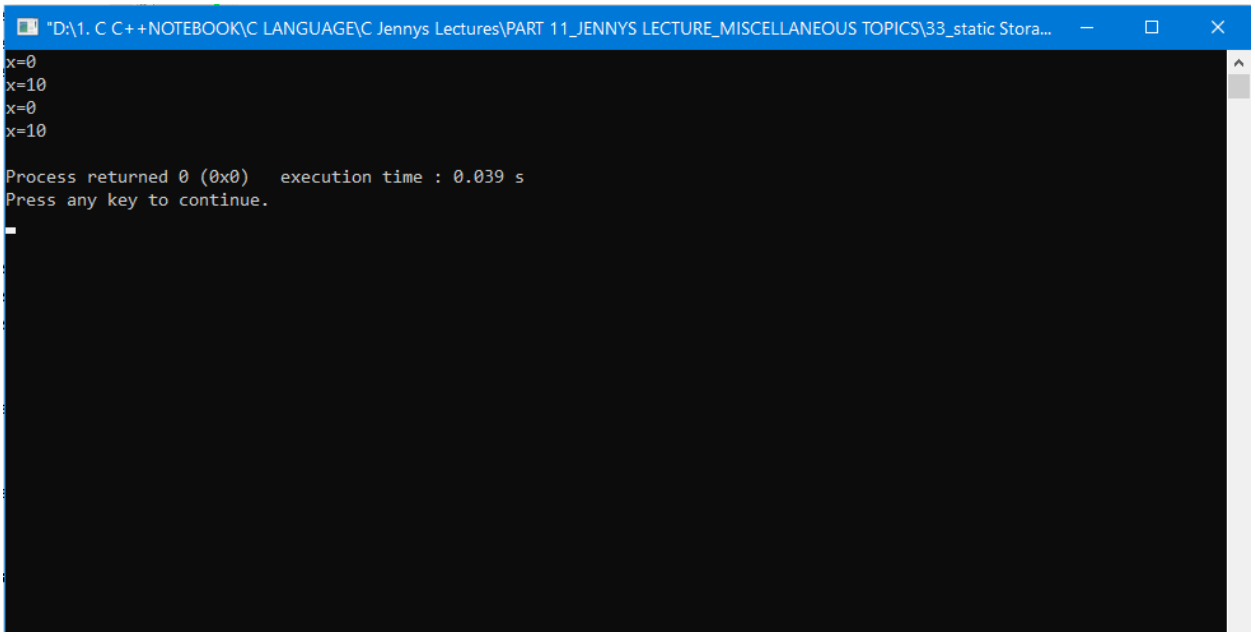
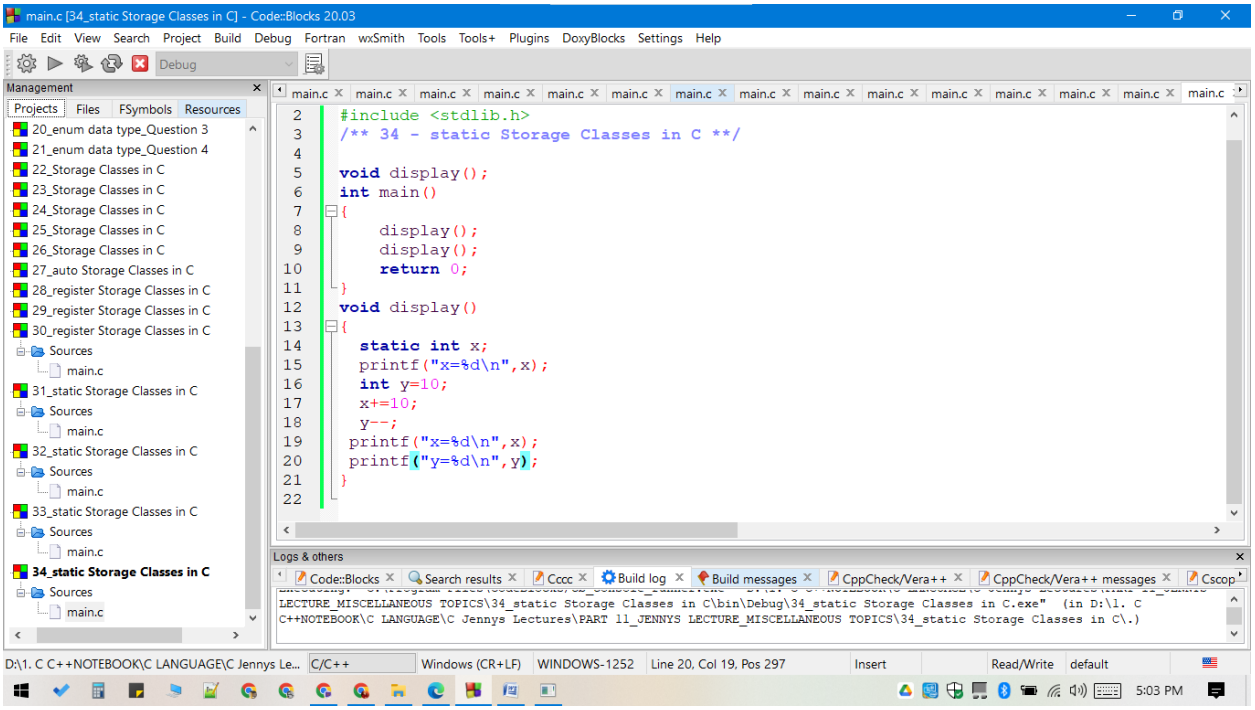
25_Storage Classes in C
26_Storage Classes in C
27_auto Storage Classes in C
28_register Storage Classes in C
29_register Storage Classes in C
30_register Storage Classes in C
Sources
main.c
31_static Storage Classes in C
Sources
main.c
32_static Storage Classes in C
Sources
main.c
33_static Storage Classes in C
Sources
main.c
1 #include <stdio.h>
2 #include <stdlib.h>
3 /** 33 - static Storage Classes in C **/
4
5 void display();
6 int main()
7 {
8 display();
9 display();
10 return 0;
11 }
12 void display()
13 {
14 int x=0; //without static; by default it will be auto
15 printf("x=%d\n",x);
16 x+=10;
17 printf("x=%d\n",x);
18 }
19
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscop
LECTURE_MISCELLANEOUS TOPICS\33_static Storage Classes in C\bin\Debug\33_static Storage Classes in C.exe" (in D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Lectures\PART 11_JENNYS LECTURE_MISCELLANEOUS TOPICS\33_static Storage Classes in C\.)
D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Le... C/C++ Windows (CR+LF) WINDOWS-1252 Line 14, Col 10, Pos 195 Insert Read/Write default
5:00 PM


"D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Lectures\PART 11_JENNYS LECTURE_MISCELLANEOUS TOPICS\33_static Stora...
x=0
x=10
x=0
x=10
Process returned 0 (0x0) execution time : 0.039 s
Press any key to continue.


main.c [34_static Storage Classes in C] - Code::Blocks 20.03
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20_enum data type_Question 3
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24_Storage Classes in C
25_Storage Classes in C
26_Storage Classes in C
27_auto Storage Classes in C
28_register Storage Classes in C
29_register Storage Classes in C
30_register Storage Classes in C
Sources
main.c
31_static Storage Classes in C
Sources
main.c
32_static Storage Classes in C
Sources
main.c
33_static Storage Classes in C
Sources
main.c
34_static Storage Classes in C
Sources
main.c
#include <stdlib.h>
/** 34 - static Storage Classes in C **/
void display();
int main()
{
display();
display();
return 0;
}
void display()
{
static int x;
printf("x=%d\n",x);
int y=10;
x+=10;
y--;
printf("x=%d\n",x);
printf("y=%d\n",y);
}
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscop
LECTURE_MISCELLANEOUS TOPICS\34_static Storage Classes in C\bin\Debug\34_static Storage Classes in C.exe" (in D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Lectures\PART 11_JENNYS LECTURE_MISCELLANEOUS TOPICS\34_static Storage Classes in C\.)
D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Le...
C/C++
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Line 20, Col 19, Pos 297
Insert
Read/Write
default
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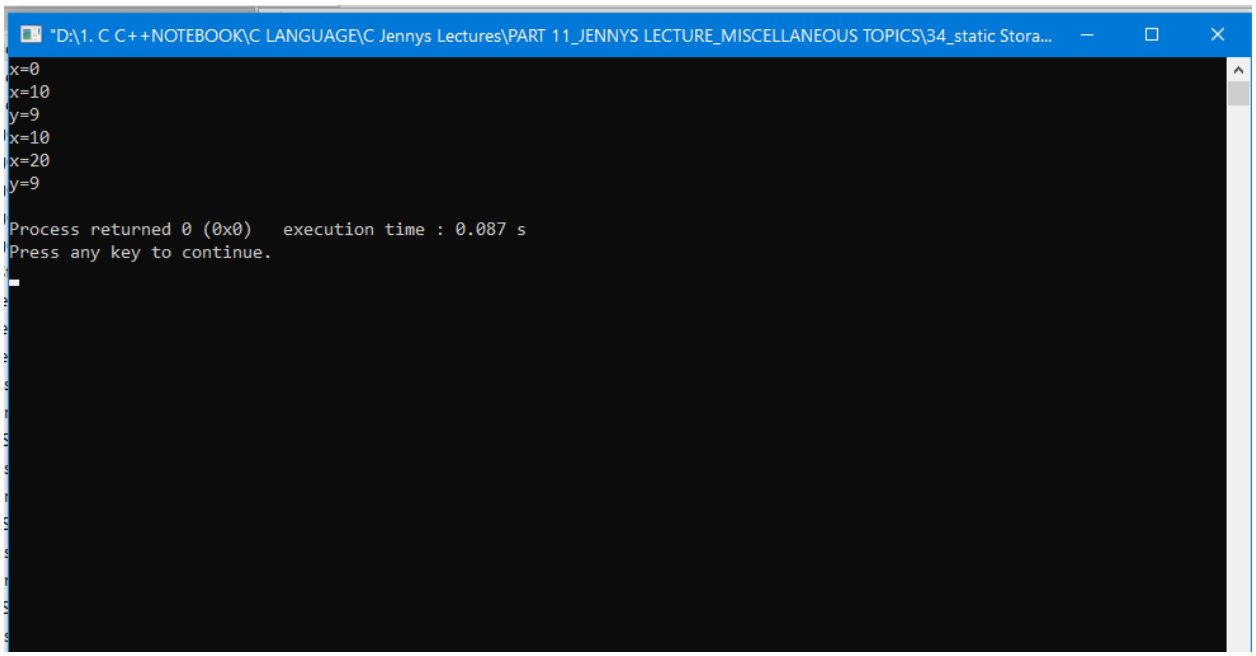
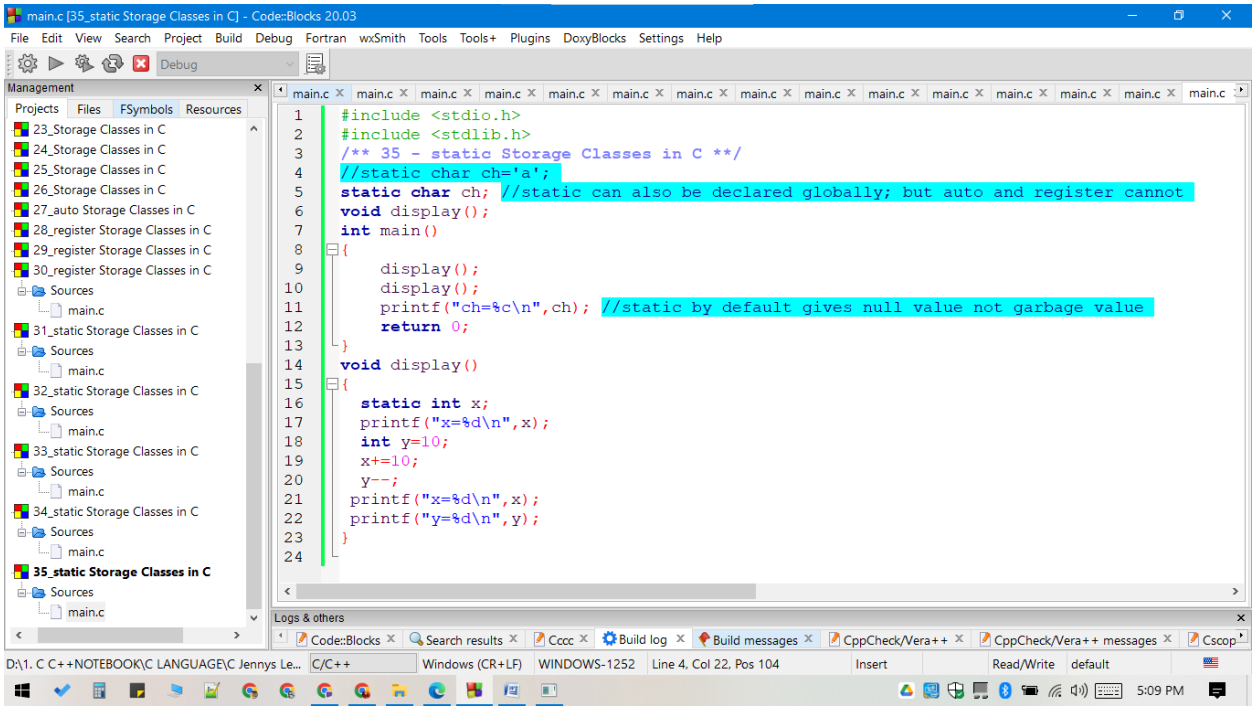

"D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Lectures\PART 11_JENNYS LECTURE_MISCELLANEOUS TOPICS\34_static Stora...
x=0
x=10
y=9
x=10
x=20
y=9
Process returned 0 (0x0) execution time : 0.087 s
Press any key to continue.


main.c [35_static Storage Classes in C] - Code::Blocks 20.03
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27_auto Storage Classes in C
28_register Storage Classes in C
29_register Storage Classes in C
30_register Storage Classes in C
31_static Storage Classes in C
32_static Storage Classes in C
33_static Storage Classes in C
34_static Storage Classes in C
35_static Storage Classes in C
Sources
main.c
#include <stdio.h>
#include <stdlib.h>
/** 35 - static Storage Classes in C **/
//static char ch='a';
static char ch; //static can also be declared globally; but auto and register cannot
void display();
int main()
{
display();
display();
printf("ch=%c\n",ch); //static by default gives null value not garbage value
return 0;
}
void display()
{
static int x;
printf("x=%d\n",x);
int y=10;
x+=10;
y--;
printf("x=%d\n",x);
printf("y=%d\n",y);
}
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscop
D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Le... C/C++ Windows (CR+LF) WINDOWS-1252 Line 4, Col 22, Pos 104 Insert Read/Write default
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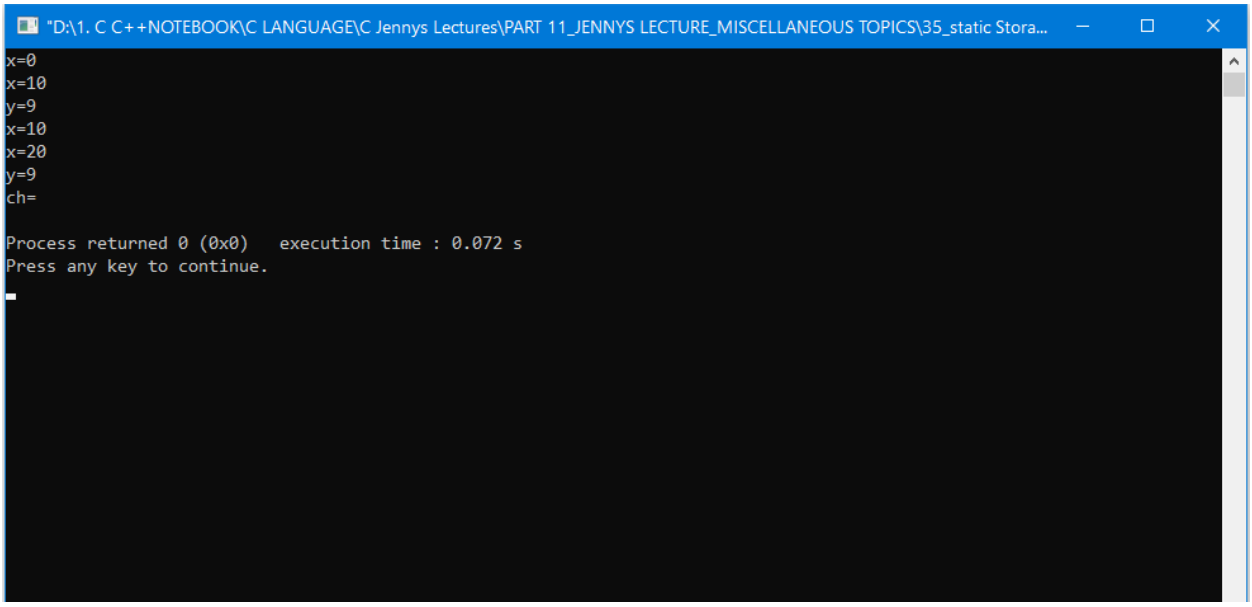
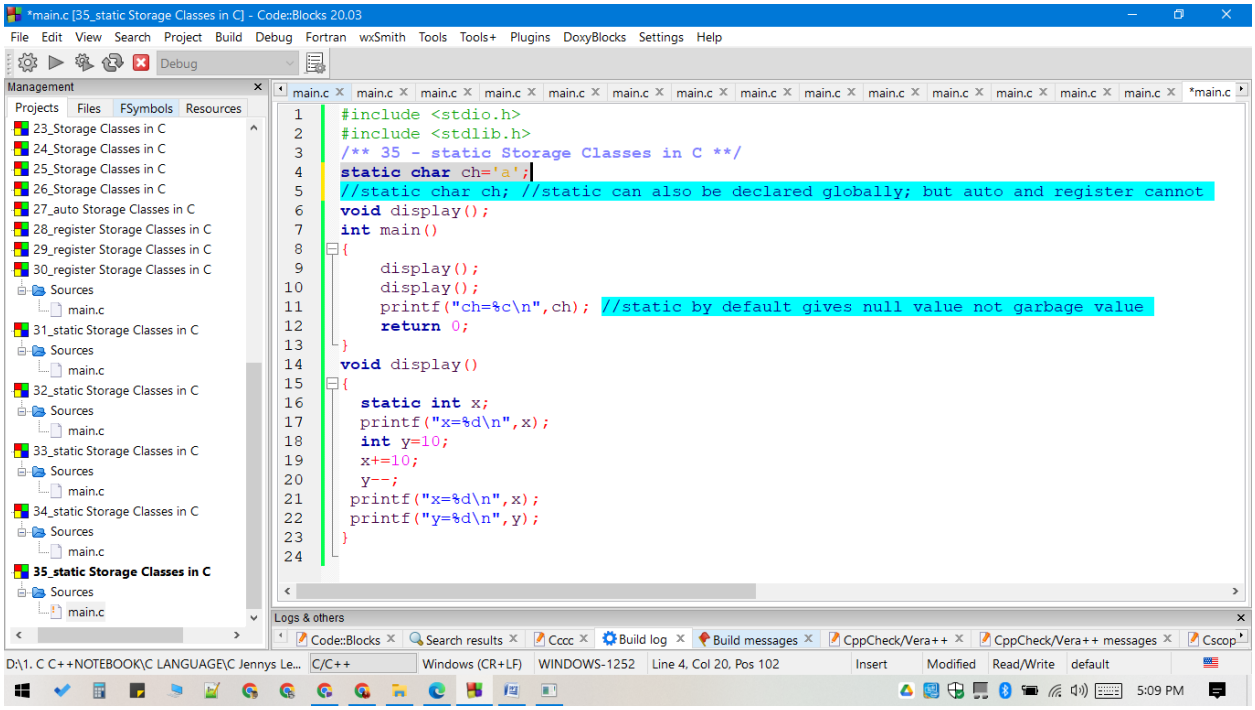

"D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Lectures\PART 11_JENNYS LECTURE_MISCELLANEOUS TOPICS\35_static Stora...
x=0
x=10
y=9
x=10
x=20
y=9
ch=
Process returned 0 (0x0) execution time : 0.072 s
Press any key to continue.


*main.c [35_static Storage Classes in C] - Code::Blocks 20.03
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27_auto Storage Classes in C
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29_register Storage Classes in C
30_register Storage Classes in C
Sources
main.c
31_static Storage Classes in C
32_static Storage Classes in C
33_static Storage Classes in C
34_static Storage Classes in C
35_static Storage Classes in C
main.c
#include <stdio.h>
#include <stdlib.h>
/** 35 - static Storage Classes in C **/
static char ch='a';
//static char ch; //static can also be declared globally; but auto and register cannot
void display();
int main()
{
display();
display();
printf("ch=%c\n",ch); //static by default gives null value not garbage value
return 0;
}
void display()
{
static int x;
printf("x=%d\n",x);
int y=10;
x+=10;
y--;
printf("x=%d\n",x);
printf("y=%d\n",y);
}
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscop
D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Le... C/C++ Windows (CR+LF) WINDOWS-1252 Line 4, Col 20, Pos 102 Insert Modified Read/Write default
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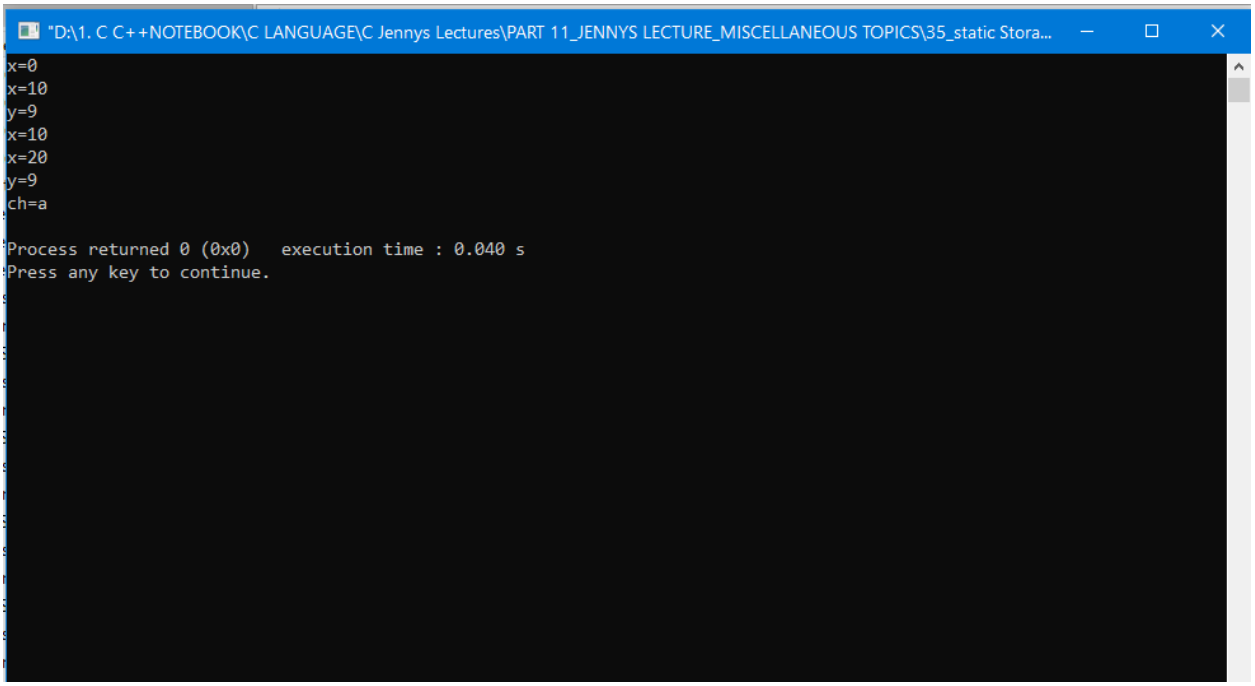
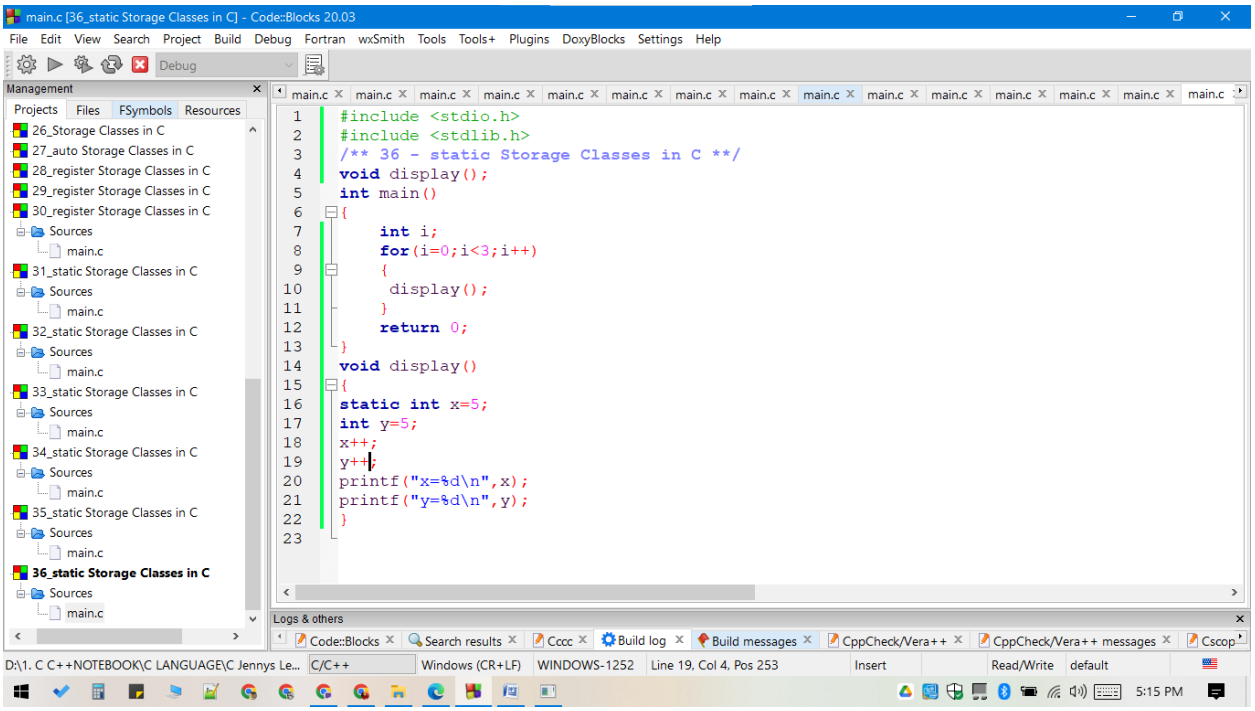

"D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Lectures\PART 11_JENNYS LECTURE_MISCELLANEOUS TOPICS\35_static Stora...
x=0
x=10
y=9
x=10
x=20
y=9
ch=a
Process returned 0 (0x0) execution time : 0.040 s
Press any key to continue.


main.c [36_static Storage Classes in C] - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
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26_Storage Classes in C
27_auto Storage Classes in C
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29_register Storage Classes in C
30_register Storage Classes in C
31_static Storage Classes in C
32_static Storage Classes in C
33_static Storage Classes in C
34_static Storage Classes in C
35_static Storage Classes in C
36_static Storage Classes in C
Sources
main.c
1 #include <stdio.h>
2 #include <stdlib.h>
3 /** 36 - static Storage Classes in C **/
4 void display();
5 int main()
6 {
7 int i;
8 for(i=0;i<3;i++)
9 {
10 display();
11 }
12 return 0;
13 }
14 void display()
15 {
16 static int x=5;
17 int y=5;
18 x++;
19 y++;
20 printf("x=%d\n",x);
21 printf("y=%d\n",y);
22 }
23
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscop
D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Le... C/C++ Windows (CR+LF) WINDOWS-1252 Line 19, Col 4, Pos 253 Insert Read/Write default
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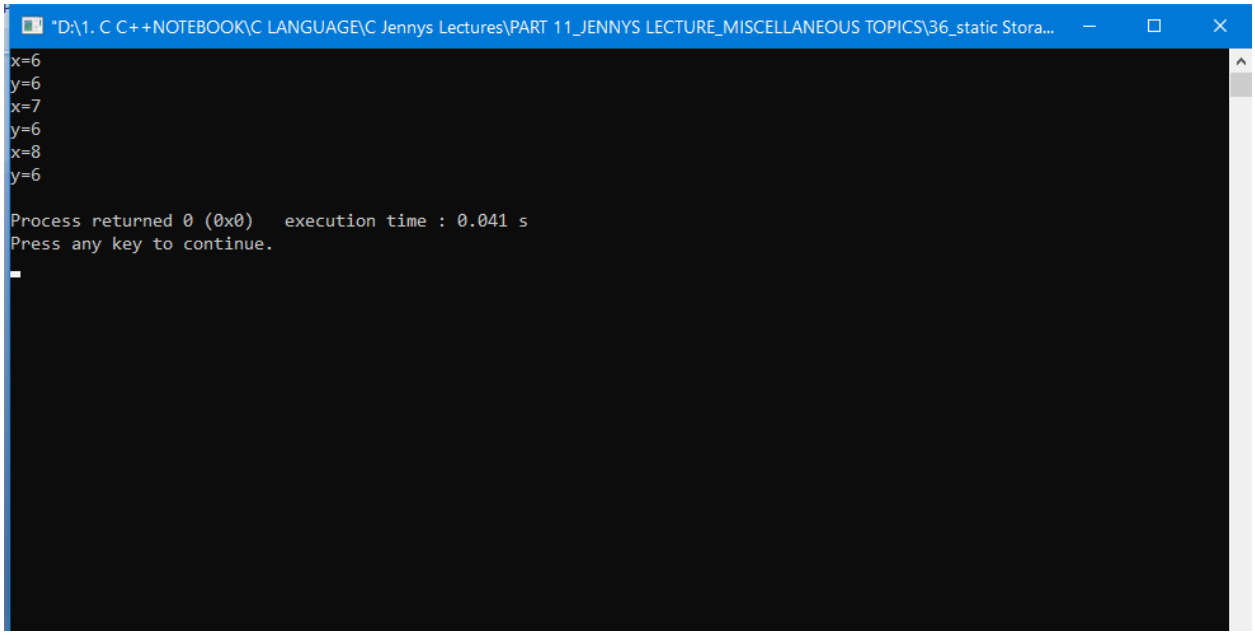
"D:\1. C C++NOTEBOOK\C LANGUAGE\C Jennys Lectures\PART 11_JENNYS LECTURE_MISCELLANEOUS TOPICS\36_static Stora...
x=6
y=6
x=7
y=6
x=8
y=6
Process returned 0 (0x0)   execution time : 0.041 s
Press any key to continue.