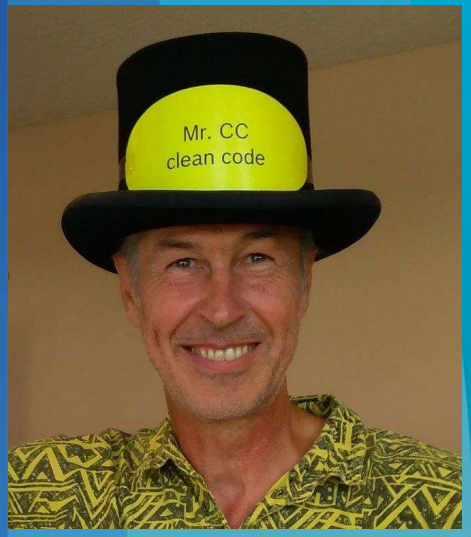
# LIFE CYCLE SESSION 2

## COMPILER SYNTHESIZED METHODS AND RULES

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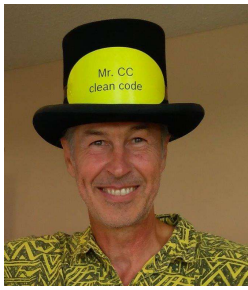
BOSCH

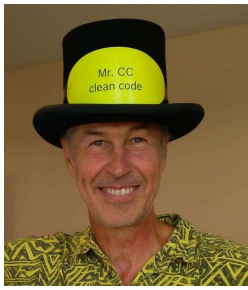
# C++ Basics: Lifecycle
## Session 2 Solution 1




- Your class may almost look like this

```
11 class A{
12 public:
13 //  A(int i):i(i){}
14     int i;
15 };
```

# C++ Basics: Lifecycle
## Session 2 Solution 1



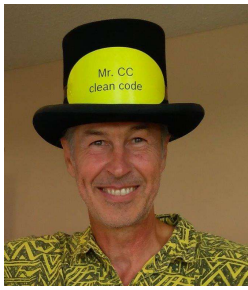

- Exercise 1: Output should almost look like this
  - `A a1;` Member i is uninitialized after default constructor
  - `a.i=42;` assignment to i
  - As you can see, member `i` is copied during initialization and assignment
  - Move default copies the values

```
<terminated> (exit value: 0) SessionTwo [C
SessionTwo
=== begin lifecycle()
{
=== begin Block
=== A a1;
a1.i: -352616416
a1.i=42: 42
=== A a2 = a1;
a2.i: 42
=== A a3(a1);
a3.i: 42
=== a1.i = 43: 43
=== a2 = a1
a2.i: 43
=== A a4(std::move(a1));
a1.i: 43
a4.i: 43
a4 = std::move(a3);
a3.i: 42
a4.i: 42
=== end Block
}
=== end lifecycle()
```

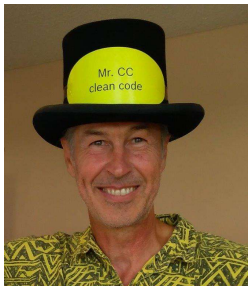
# C++ Basics: Lifecycle
## Session 2 Solution 2

- Statements and Expressions
- Explain the following lines
  - Each line is a statement, cause of the **;** at the end
  - 14: compound statement opens a new scope
  - 17: Definition of object a1 Default Ctor
  - 22: Definition of object a2 implizit Copy Ctor
  - 25: Definition of object a3 explizit Copy Ctor
  - 31: Copy Assignment
  - 35: Definition of object a4 explicit Move Ctor
  - 40: Move Assignment
  - 45: end of compound statement
    all local objects will be destroyed

```
 7 #include "A1Empty.hpp"
 8
 9 #include <iostream>
10 using namespace std;
11
12 void lifecycle(){
13     cout << "=== begin lifecycle()" << endl;
14     {
15         cout << "{\n=== begin Block" << endl;
16         cout << "=== A a1;" << endl;
17         A a1;
18         cout << "a1.i: " << a1.i << endl;
19         a1.i = 42;
20         cout << "a1.i=42: " << a1.i << endl;
21         cout << "=== A a2 = a1;" << endl;
22         A a2 = a1;
23         cout << "a2.i: " << a2.i << endl;
24         cout << "=== A a3(a1);" << endl;
25         A a3(a1);
26         cout << "a3.i: " << a3.i << endl;
27         a1.i = 43;
28         cout << "=== a1.i = 43: " << a1.i << endl;
29
30         cout << "=== a2 = a1" << endl;
31         a2 = a1;
32         cout << "a2.i: " << a2.i << endl;
33
34         cout << "=== A a4(std::move(a1));" << endl;
35         A a4(std::move(a1));
36         cout << "a1.i: " << a1.i << endl;
37         cout << "a4.i: " << a4.i << endl;
38
39         cout << "a4 = std::move(a3);" << endl;
40         a4 = std::move(a3);
41         cout << "a3.i: " << a3.i << endl;
42         cout << "a4.i: " << a4.i << endl;
43
44         cout << "=== end Block \n}" << endl;
45     }
46     cout << "=== end lifecycle()" << endl;
47 }
```



# C++ Basics: Lifecycle
## Session 2 Solution 3




- A default constructor is only synthesized if there is no other user defined constructor
- Compiler Message

../src/Lifecycle.cpp:17:5: error:

no matching function for call to ‘A::A()’

```
  A a1;
    ^~
```

```
11 class A{
12 public:
13     A(int i):i(i){}
14     int i;
15 };
```