


EECS402


Compiling and Running


Andrew M. Morgan



Fixing Compile Errors


- ALWAYS** start with the first error!!
 - Later errors are often a result of the compiler getting confused from earlier errors
- Usually* try to fix the first error and then re-compile
 - Don't try to track down the first 10 errors without compiling in between
 - Since later errors often result from prior errors, you could be looking for an error that isn't really there
- The line number provided by the compiler is an *indication* of where the problem is
 - The error is actually often one or more lines prior to the line number reported


Andrew M Morgan
 4
 



Compiler/Linker Used For This Course

- There are many compilers available
- For this course, we use a compiler named "g++", available on the UNIX operating system
- Usage:
 - g++ -Wall filePrefix.cpp -o filePrefix
 - Wall means to display all warnings detected (some are suppressed by default)
 - o <fileName> specifies the name of the resulting output (executable) file
- Example:
 - g++ -Wall genResults.cpp -o genResults
 - Compiles and links the C++ source code in a file named genResults.cpp and creates an executable file named genResults
- Output executable is only created if no compile or link errors are found!

Andrew M Morgan
 2
 



Example Program


```


1 #include <iostream>
2 using namespace std;
3
4 void swap(int &val1, int &val2);
5
6 int main()
7 {
8     int x = 45;
9     int y = 30;
10    if (y < x)
11    {
12        swap(x, y);
13    }
14
15    cout << "Min: " << x << " Max: " << y << endl;
16
17    return (0);
18 }
19
20 void swap(int &val1, int &val2)
21 {
22     int temp;
23     temp = val1;
24     val1 = val2;
25     val2 = temp;
26 }
27

```

[7] temp <- lg
 g++ -Wall myProgram.cpp -o myProgram
 myProgram.cpp: In function 'int main':
 myProgram.cpp:16: error: 'cout' undeclared (first use this function)
 myProgram.cpp:16: error: (Each undeclared identifier is reported only once for each function it appears in.)
 myProgram.cpp:18: error: syntax error before 'return'
 myProgram.cpp: In function 'void swap(int&, int&):'
 myProgram.cpp:26: error: 'val3' undeclared (first use this function)
 [8] temp <-

This error usually means you forgot to declare a variable OR mistyped the identifier of the variable you intended to reference

Andrew M Morgan
 5
 



Example Program


```


1 #include <iostream>
2 using namespace std;
3
4 void swap(int &val1, int &val2);
5
6 int main()
7 {
8     int x = 45;
9     int y = 30;
10    if (y < x)
11    {
12        swap(x, y);
13    }
14
15    cout << "Min: " << x << " Max: " << y << endl;
16
17    return (0);
18 }
19
20 void swap(int &val1, int &val2)
21 {
22     int temp;
23     temp = val1;
24     val1 = val2;
25     val2 = temp;
26 }
27

```

[8] temp <- g++ -Wall myProgram.cpp -o myProgram
 myProgram.cpp: In function 'int main':
 myProgram.cpp:16: error: 'cout' undeclared (first use this function)
 myProgram.cpp:16: error: (Each undeclared identifier is reported only once for each function it appears in.)
 myProgram.cpp:18: error: syntax error before 'return'
 myProgram.cpp: In function 'void swap(int&, int&):'
 myProgram.cpp:26: error: 'val3' undeclared (first use this function)
 [9] temp <-

Compile Command
 My UNIX Prompt
 Line Number
 Error Description

Andrew M Morgan
 3
 



Example Program


```

1 #include <iostream>
2 using namespace std;
3
4 void swap(int &val1, int &val2);
5
6 int main()
7 {
8     int x = 45;
9     int y = 30;
10    if (y < x)
11    {
12        swap(x, y);
13    }
14
15    cout << "Min: " << x << " Max: " << y << endl;
16
17    return (0);
18 }
19
20 void swap(int &val1, int &val2)
21 {
22     int temp;
23     temp = val1;
24     val1 = val2;
25     val2 = temp;
26 }
27

```

[7] temp <- lg
 g++ -Wall myProgram.cpp -o myProgram
 myProgram.cpp: In function 'int main':
 myProgram.cpp:16: error: 'cout' undeclared (first use this function)
 myProgram.cpp:16: error: (Each undeclared identifier is reported only once for each function it appears in.)
 myProgram.cpp:18: error: syntax error before 'return'
 myProgram.cpp: In function 'void swap(int&, int&):'
 myProgram.cpp:26: error: 'val3' undeclared (first use this function)
 [8] temp <-

This error usually means you forgot to declare a variable OR mistyped the identifier of the variable you intended to reference

Andrew M Morgan
 6
 

Example Program

```

1 #include <iostream>
2 using namespace std;
3
4 void swap(int val1, int &val2);
5
6 int main()
7 {
8     int x = 45;
9     int y = 30;
10    if (y < x)
11    {
12        swap(x, y);
13    }
14
15    cout << "Min: " << x << " Max: " << y << endl;
16
17    return (0);
18 }
19
20 void swap(int &val1, int &val2)
21 {
22     int temp;
23     temp = val1;
24     val1 = val2;
25     val3 = temp;
26 }
27

```

Syntax errors occur when you didn't follow the rules of C++. Often due to things like missing parentheses around an expression in an if statement, or missing semi-colons, or mismatched curly braces, etc.

Andrew M Morgan 7

Example Program

```

1 #include <iostream>
2 using namespace std;
3
4 void swap(int val1, int &val2);
5
6 int main()
7 {
8     int x = 45;
9     int y = 30;
10    if (y < x)
11    {
12        swap(x, y);
13    }
14
15    cout << "Min: " << x << " Max: " << y << endl;
16
17    return (0);
18 }
19
20 void swap(int &val1, int &val2)
21 {
22     int temp;
23     temp = val1;
24     val1 = val2;
25     val3 = temp;
26 }
27

```

Just keep fixing errors until there are no more..

Andrew M Morgan 10

Example Program

```

1 #include <iostream>
2 using namespace std;
3
4 void swap(int val1, int &val2);
5
6 int main()
7 {
8     int x = 45;
9     int y = 30;
10    if (y < x)
11    {
12        swap(x, y);
13    }
14
15    cout << "Min: " << x << " Max: " << y << endl;
16
17    return (0);
18 }
19
20 void swap(int &val1, int &val2)
21 {
22     int temp;
23     temp = val1;
24     val1 = val2;
25     val3 = temp;
26 }
27

```

- Compiler realizes there is an error when it gets to line 18
- BUT line 18 is fine.
- Compiler got confused from an earlier line.

Syntax errors occur when you didn't follow the rules of C++. Often due to things like missing parentheses around an expression in an if statement, or missing semi-colons, or mismatched curly braces, etc.

Andrew M Morgan 8

Example Program

```

1 #include <iostream>
2 using namespace std;
3
4 void swap(int val1, int &val2);
5
6 int main()
7 {
8     int x = 45;
9     int y = 30;
10    if (y < x)
11    {
12        swap(x, y);
13    }
14
15    cout << "Min: " << x << " Max: " << y << endl;
16
17    return (0);
18 }
19
20 void swap(int &val1, int &val2)
21 {
22     int temp;
23     temp = val1;
24     val1 = val2;
25     val2 = temp;
26 }
27

```

As the compiler gets farther along, newly discovered errors may turn up.

This error is a **linker** error, so it looks different than a compiler error. No line numbers, etc

Linker errors usually involve missing function bodies, inconsistent function signatures, etc..

Andrew M Morgan 11

Example Program

```

1 #include <iostream>
2 using namespace std;
3
4 void swap(int val1, int &val2);
5
6 int main()
7 {
8     int x = 45;
9     int y = 30;
10    if (y < x)
11    {
12        swap(x, y);
13    }
14
15    cout << "Min: " << x << " Max: " << y << endl;
16
17    return (0);
18 }
19
20 void swap(int &val1, int &val2)
21 {
22     int temp;
23     temp = val1;
24     val1 = val2;
25     val3 = temp;
26 }
27

```

Just keep fixing errors until there are no more..

Andrew M Morgan 9

Example Program

```

1 #include <iostream>
2 using namespace std;
3
4 void swap(int val1, int &val2);
5
6 int main()
7 {
8     int x = 45;
9     int y = 30;
10    if (y < x)
11    {
12        swap(x, y);
13    }
14
15    cout << "Min: " << x << " Max: " << y << endl;
16
17    return (0);
18 }
19
20 void swap(int &val1, int &val2)
21 {
22     int temp;
23     temp = val1;
24     val1 = val2;
25     val2 = temp;
26 }
27

```

As the compiler gets farther along, newly discovered errors may turn up.

This error is a **linker** error, so it looks different than a compiler error. No line numbers, etc

Linker errors usually involve missing function bodies, inconsistent function signatures, etc..

Andrew M Morgan 12

Example Program

```

1 #include <iostream>
2 using namespace std;
3
4 void swap(int val1, int &val2);
5
6 int main()                [5] temp :- g++ -Wall myProgram.cpp -o myProgram
7 {                          [6] temp :-
8     int x = 45;
9     int y = 30;
10
11     if (y < x)
12     {
13         swap(x, y);
14     }
15
16     cout << "Min: " << x << " Max: " << y << endl;
17
18     return (0);
19 }
20
21 void swap(int val1, int &val2)
22 {
23     int temp;
24     temp = val1;
25     val1 = val2;
26     val2 = temp;
27 }

```

No more compile or link errors!!!

You can now run the executable file created to check its results!

Andrew M Morgan 13

Back to the Example

```

1 #include <iostream>
2 using namespace std;
3
4 void swap(int val1, int &val2);
5
6 int main()                [10] temp :- g++ -Wall myProgram.cpp -o myProgram
7 {                          [11] temp :- ./myProgram
8     int x = 45;            Min: 45 Max: 45
9     int y = 30;           [12] temp :-
10
11     if (y < x)
12     {
13         swap(x, y);
14     }
15
16     cout << "Min: " << x << " Max: " << y << endl;
17
18     return (0);
19 }
20
21 void swap(int val1, int &val2)
22 {
23     int temp;
24     temp = val1;
25     val1 = val2;
26     val2 = temp;
27 }

```

NOTE: Results are not what we expected!

No compile/link errors does NOT imply the program is correct!

This type of error is called a logic error.

Andrew M Morgan 16

Executing Your Program

- To run your program:
 - In the directory containing the executable, type a dot, a slash, and the name of the executable
 - The "." tells the computer to run the executable with the name provided in the current directory
 - Without the "." a different executable with the same name may be executed and the results can be confusing
- Examples:
 - ./myProgram
 - ./runTheProgram

Andrew M Morgan 14

Back to the Example

```

1 #include <iostream>
2 using namespace std;
3
4 void swap(int &val1, int &val2);
5
6 int main()                [10] temp :- g++ -Wall myProgram.cpp -o myProgram
7 {                          [11] temp :- ./myProgram
8     int x = 45;            Min: 30 Max: 45
9     int y = 30;           [12] temp :-
10
11     if (y < x)
12     {
13         swap(x, y);
14     }
15
16     cout << "Min: " << x << " Max: " << y << endl;
17
18     return (0);
19 }
20
21 void swap(int &val1, int &val2)
22 {
23     int temp;
24     temp = val1;
25     val1 = val2;
26     val2 = temp;
27 }

```

NOTE: Results are not what we expected!

No compile/link errors does NOT imply the program is correct!

This type of error is called a logic error.

Andrew M Morgan 17

Back to the Example

```

1 #include <iostream>
2 using namespace std;
3
4 void swap(int val1, int &val2);
5
6 int main()                [10] temp :- g++ -Wall myProgram.cpp -o myProgram
7 {                          [11] temp :- ./myProgram
8     int x = 45;            Min: 45 Max: 45
9     int y = 30;           [12] temp :-
10
11     if (y < x)
12     {
13         swap(x, y);
14     }
15
16     cout << "Min: " << x << " Max: " << y << endl;
17
18     return (0);
19 }
20
21 void swap(int val1, int &val2)
22 {
23     int temp;
24     temp = val1;
25     val1 = val2;
26     val2 = temp;
27 }

```

NOTE: Results are not what we expected!

No compile/link errors does NOT imply the program is correct!

This type of error is called a logic error.

Andrew M Morgan 15