

# CSCI 1370

FEBRUARY 22, 2017

A program can execute sequentially, ***conditionally***, and/or ***iteratively***.

SEQUENTIAL EXECUTION

```
1 #include <iostream>
2
3
4 using namespace std;
5
6 int main()
7 {
8     string s;
9     cout << "Hello! What is your name?\n";
10    cin >> s;
11    cout << "Nice to meet you " << s << "!";
12 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string s;
7     cout << "Hello! What is your name?\n";
8     cin >> s;
9     cout << "Nice to meet you " << s << "!";
10 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string s;
7     cout << "Hello! What is your name?\n";
8     cin >> s;
9     cout << "Nice to meet you " << s << "!";
10 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string s;
7     cout << "Hello! What is your name?\n";
8     cin >> s;
9     cout << "Nice to meet you " << s << "!";
10 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string s;
7     cout << "Hello! What is your name?\n";
8     cin >> s;
9     cout << "Nice to meet you " << s << "!";
10 }
```



```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string s;
7     cout << "Hello! What is your name?\n";
8     cin >> s;
9     cout << "Nice to meet you " << s << "!";
10 }
```

Hello! What is your name?

```
1 #include <iostream>
2
3
4 using namespace std;
5
6 int main()
7 {
8     string s;
9     cout << "Hello! What is your name?\n";
10    cin >> s;
11    cout << "Nice to meet you " << s << "!";
12 }
13
```

```
Hello! What is your name?
Professor
```

```
1 #include <iostream>
2
3
4 using namespace std;
5
6 int main()
7 {
8     string s;
9     cout << "Hello! What is your name?\n";
10    cin >> s;
11    cout << "Nice to meet you " << s << "!";
12 }
```

```
Hello! What is your name?
Professor
Nice to meet you Professor!
```



```
1 #include <iostream>
2
3
4 using namespace std;
5
6 int main()
7 {
8     float score;
9     cout << "What is your score?\n";
10    cin >> score;
11    cout << "You entered: " << score << ".";
12 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     float score;
7     cout << "What is your score?\n";
8     cin >> score;
9     cout << "You entered: " << score << ".";
10 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     float score;
7     cout << "What is your score?\n";
8     cin >> score;
9     cout << "You entered: " << score << ".";
10 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     float score;
7     cout << "What is your score?\n";
8     cin >> score;
9     cout << "You entered: " << score << ".";
10 }
```



```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     float score;
7     cout << "What is your score?\n";
8     cin >> score;
9     cout << "You entered: " << score << ".";
10 }
```

```
1 #include <iostream>
2
3
4 using namespace std;
5
6 int main()
7 {
8     float score;
9     cout << "What is your score?\n";
10    cin >> score;
11    cout << "You entered: " << score << ".";
12 }
```

What is your score?

```
1 #include <iostream>
2
3
4 using namespace std;
5
6 int main()
7 {
8     float score;
9     cout << "What is your score?\n";
10    cin >> score;
11    cout << "You entered: " << score << ".";
12 }
13 }
```

What is your score?  
91.8

```
1 #include <iostream>
2
3
4 using namespace std;
5
6 int main()
7 {
8     float score;
9     cout << "What is your score?\n";
10    cin >> score;
11    cout << "You entered: " << score << ".";
12 }
```

What is your score?  
91.8  
You entered: 91.8.

# CONDITIONAL EXECUTION

# if

The computer executes a **code block** *if* the specified conditions (a **logical expression**) are met.

EXAMPLE:

A SIMPLE POINT-TO-GRADE CONVERTER  
(pass/fail)

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```



# IF STATEMENT

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

# LOGICAL EXPRESSION

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

# CODE BLOCK

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

```
if (score >= 60) {...}
```

(Translation: "If the score is greater than or equal to 60, then..")

```
if (score >= 60) {...}
```

(Translation: "If the score is greater than or equal to 60, then...")

```
if (score >= 60) {...}
```

(Translation: "If the score is greater than or equal to 60, then...")



```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```



EXECUTION ON INPUT OF 64.2

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
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9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

```
1 #include <iostream>
2 using namespace std;
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4 int main()
5 {
6     string grade;
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9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
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8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
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9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

What is your score?

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

What is your score?  
64.2



```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

What is your score?  
64.2

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

What is your score?  
64.2

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

What is your score?  
64.2

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

What is your score?  
64.2

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

What is your score?  
64.2  
You: pass.



EXECUTION ON INPUT OF 59.9

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```



```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

What is your score?

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

What is your score?  
59.9

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

```
What is your score?
59.9
You: .
```

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    cout << "You: " << grade << ".";
15 }
```

What is your score?  
59.9  
You: .





# if-else

The computer executes a particular code block *if* the specified conditions are met. *Otherwise*, the computer executes a different code block.

EXAMPLE:

UPDATED POINT-TO-GRADE CONVERTER  
(pass/fail)

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
16    }
17    cout << "You: " << grade << ".";
18 }
```

# IF STATEMENT

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

# LOGICAL EXPRESSION

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
```

# CODE BLOCK

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
16    }
17    cout << "You: " << grade << ".";
18 }
```

# CODE BLOCK

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else // score < 60
15    {
16        grade = "fail";
16    }
17    cout << "You: " << grade << ".";
18 }
```





```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

EXECUTION ON INPUT OF 95.7

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

```
4 int main()  
5 {  
6     string grade;  
7     float score;  
8     cout << "What is your score?\n";  
9     cin >> score;  
10    if (score >= 60)  
11    {  
12        grade = "pass";  
13    }  
14    else  
15    {  
16        grade = "fail";  
17    }  
18    cout << "You: " << grade << ".";  
19 }
```

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```



```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
95.7

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
95.7

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
95.7

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
95.7

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
95.7

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
95.7

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
95.7  
You: pass.



EXECUTION ON INPUT OF 33.3

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

```
4 int main()  
5 {  
6     string grade;  
7     float score;  
8     cout << "What is your score?\n";  
9     cin >> score;  
10    if (score >= 60)  
11    {  
12        grade = "pass";  
13    }  
14    else  
15    {  
16        grade = "fail";  
17    }  
18    cout << "You: " << grade << ".";  
19 }
```

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
33.3



```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
33.3

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
33.3

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
33.3

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
33.3

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
33.3

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
33.3

```
4 int main()
5 {
6     string grade;
7     float score;
8     cout << "What is your score?\n";
9     cin >> score;
10    if (score >= 60)
11    {
12        grade = "pass";
13    }
14    else
15    {
16        grade = "fail";
17    }
18    cout << "You: " << grade << ".";
19 }
```

What is your score?  
33.3  
You: fail.





if-else if-else

EXAMPLE:  
POINT-TO-GRADE CONVERTER (A-C)

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

EXECUTION ON INPUT OF 82.9

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?



```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
82.9

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
82.9

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
82.9

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
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13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
82.9

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
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13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
82.9

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
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13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
82.9

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
82.9

EXECUTION ON INPUT OF 45.1



```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
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14 else if (score >= 80)
15 {
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17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
45.1

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
45.1

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
45.1

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
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14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
45.1



```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
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13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
45.1

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
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15 {
16     grade = 'B';
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18 else
19 {
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21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
45.1

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
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13 }
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15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
45.1

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
45.1

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
45.1

EXECUTION ON INPUT OF 98.7

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```



```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
98.7

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
12     grade = 'A';
13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
98.7

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
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13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
98.7

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
11 {
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13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
98.7

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
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13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

What is your score?  
98.7

```
6 char grade;
7 float score;
8 cout << "What is your score?\n";
9 cin >> score;
10 if (score >= 90)
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13 }
14 else if (score >= 80)
15 {
16     grade = 'B';
17 }
18 else
19 {
20     grade = 'C';
21 }
22 cout << "You earned a: " << grade;
```

```
What is your score?
98.7
```



# GENERAL STRUCTURE & FLOW

# ONE-WAY CONDITIONAL EXECUTION

```
if (logical expression) {...}
```

```
if (evaluate logical expression) {...}
```

```
if (evaluates to true) {...}
```

```
if (evaluates to false) {...}
```

# TWO-WAY CONDITIONAL EXECUTION

```
if (logical expression) {...}  
else {...}
```



```
if (evaluate logical expression) {...}  
else {...}
```

```
if (evaluates to true) {...}  
else {...}
```

```
if (evaluates to false) {...}  
else {...}
```

# THREE-WAY CONDITIONAL EXECUTION

```
if (logical expression #1) {...}  
else if (logical expression #2) {...}  
else {...}
```

```
if (evaluate logical expression #1) {...}  
else if (logical expression #2) {...}  
else {...}
```

```
if (evaluates to true) {...}  
else if (logical expression #2) {...}  
else {...}
```

```
if (evaluates to false) {...}  
else if (evaluate logical expression #2) {...}  
else {...}
```



```
if (evaluates to false) {...}  
else if (evaluates to true) {...}  
else {...}
```

```
if (evaluates to false) {...}  
else if (evaluates to false) {...}  
else {...}
```

# MULTI-WAY CONDITIONAL EXECUTION

```
if (logical expression #1) {...}
else if (logical expression #2) {...}
...
else if (logical expression #n) {...}
else {...}
```

```
if (evaluate logical expression #1) {...}
else if (logical expression #2) {...}
...
else if (logical expression #n) {...}
else {...}
```

```
if (evaluates to true) {...}
else if (logical expression #2) {...}
...
else if (logical expression #n) {...}
else {...}
```

```
if (evaluates to false) {...}
else if (evaluate logical expression #2) {...}
...
else if (logical expression #n) {...}
else {...}
```

```
if (evaluates to false) {...}
else if (evaluates to true) {...}
...
else if (logical expression #n) {...}
else {...}
```



```
if (evaluates to false) {...}
else if (evaluates to false) {...}
...
else if (evaluate logical expression #n) {...}
else {...}
```

```
if (evaluates to false) {...}
else if (evaluates to false) {...}
...
else if (evaluates true) {...}
else {...}
```

```
if (evaluates to false) {...}  
else if (evaluates to false) {...}  
...  
else if (evaluates to false) {...}  
else {...}
```