Lecture 5: CS2400 Introduction to Computer Science

- Loops
while Loops

#include <iostream>
#include <cstdlib>
using namespace std;

int main()
{
    int count_down;

    cout << "How many greetings do you want? ";
    cin >> count_down;

    while (count_down != 0) {
        cout << "Hello ";
        count_down -= 1;
    }

    cout << "\nThat's all!\n";

    return(EXIT_SUCCESS);
}

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Output:

How many greetings do you want? 3
Hello Hello Hello
That's all!

How many greetings do you want? 10
Hello Hello Hello Hello Hello Hello Hello Hello Hello
Hello Hello Hello Hello
That's all!

How many greetings do you want?
Syntax of while loops:

```c
while (Logical_Expression) {
    Statement_1
    Statement_2
    ...
    Statement_Last
}
```

The following is also legal, but considered poor style:

```c
while (Logical_Expression)
    Statement_1
```
How many times must the body of the loop be executed?
Do-while Loop

do {
   Statement_1
   Statement_2
   ...
   Statement_Last
} while (Logical_Expression);

The following is also legal, but considered poor style:

do
   Statement_1
while (Logical_Expression);
Increment and Decrement Operators

`++`

`--`

What do these do?
Using do-while loops

char choice;
do {
    cout << "Please input your choice (Y/N):";
    cin >> choice;
} while ((choice != 'Y') && (choice != 'N'));}
// Program Choice #1
#include <iostream>
#include <cstdlib>
using namespace std;
int main()
{

double balance = 50.00;
int count = 0;

    cout << "This program tells you how long it takes\n"
<< "to accumulate a debt of $100, starting with\n"
<< "an initial balance of $50 owed.\n"
<< "The interest rate is 2% per month.\n";

while (balance < 100.00)
{
    balance = balance + 0.02 * balance;
    count++;
}

    cout << "After " << count << " months,\n";

cout.setf(ios::fixed);
cout.setf(ios::showpoint);
cout.precision(2);
cout << "your balance due will be $" << balance << endl;
return(EXIT_SUCCESS);
}
// Program Choice #2
#include <iostream>
#include <cstdlib>
using namespace std;

int main()
{
    int balance = 5000;
    int count = 0;

    cout << "This program tells you how long it takes\n" << "to accumulate a debt of $100, starting with\n" << "an initial balance of $50 owed.\n" << "The interest rate is 2% per month.\n";

    while (balance < 10000)
    {
        balance += balance * .02 + 0.5;
        count++;
    }

    cout << "After " << count << " months,\n";

    cout.setf(ios::fixed);
    cout.setf(ios::showpoint);
    cout.precision(2);
    cout << "your balance due will be $" << balance/100.0 << endl;

    return(EXIT_SUCCESS);
}
OUTPUT1

This program tells you how long it takes to accumulate a debt of $100, starting with an initial balance of $50 owed. The interest rate is 2% per month. After 36 months, your balance due will be $101.99

OUTPUT2

This program tells you how long it takes to accumulate a debt of $100, starting with an initial balance of $50 owed. The interest rate is 2% per month. After 35 months, your balance due will be $100.02
What is the output of the following code fragment?

```cpp
int x = 10;
while (x > 0) {
    cout << x << endl;
    x -= 3;
}
```

What if > is changed to <?
What about the following:

```cpp
int x = 10;
do {
    cout << x << endl;
    x-=3;
} while (x > 0);
```

What if > is changed to <?
Programming Style

• Indenting
• Line Breaks
• Comments
  ° // This is a comment
  ° /* This is also a comment. It can go on for multiple lines. */

• Naming Constants
Constants Continued