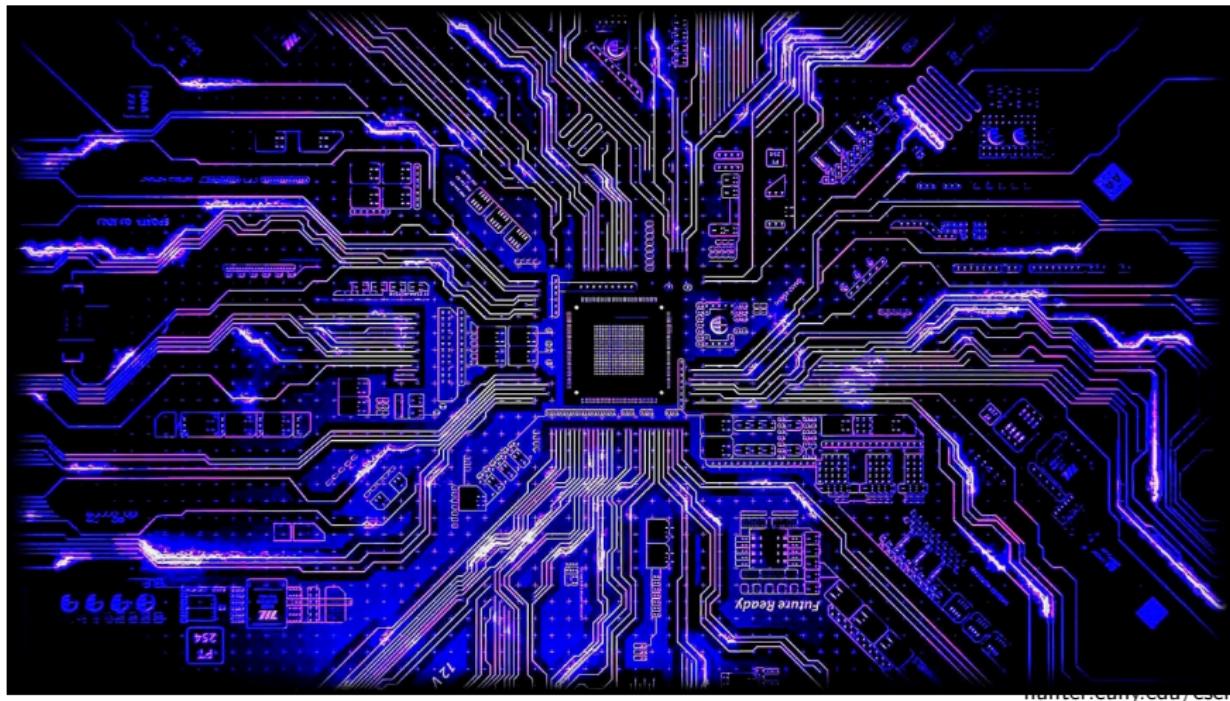


CSci 127: Introduction to Computer Science

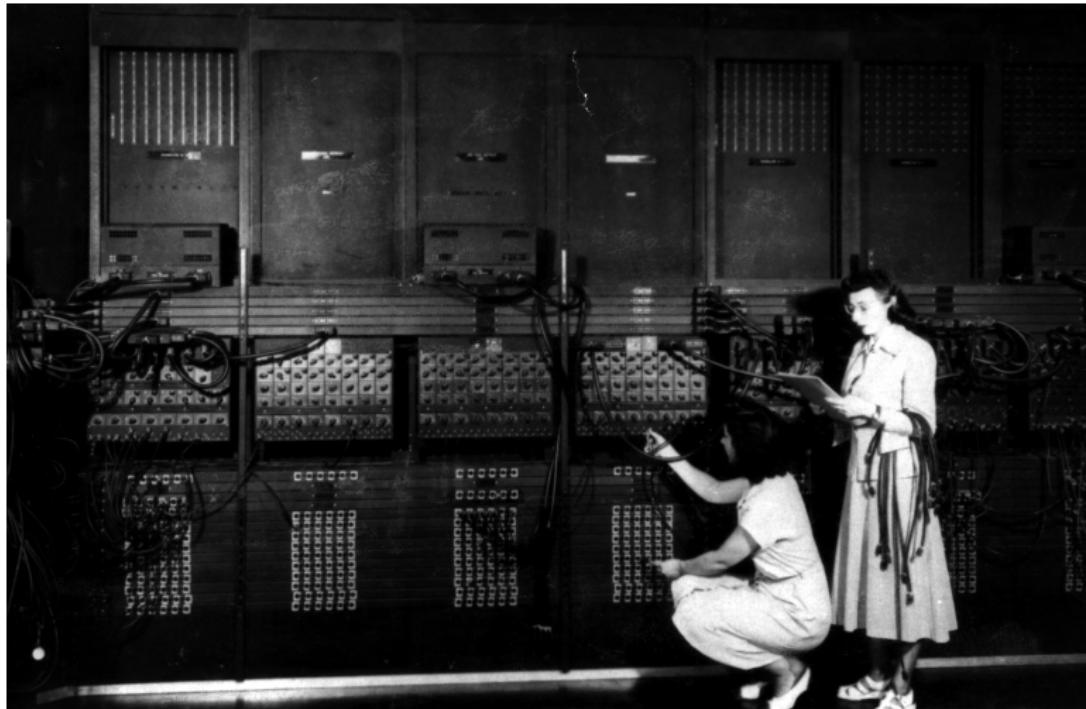


hunter.cuny.edu/csci

Announcements

- **Final Exam Thursday 11 July**
- **Wednesday 10 July we will have an IN-PERSON Mock Exam**
 - ▶ Room 1001E Hunter North
 - ▶ Only 1.35 hours for the Mock, 2 hours for the real exam.
 - ▶ Just a practice run, this WILL NOT be the same as the real exam, and it will not be graded.

CSci 127: Introduction to Computer Science



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Frequently Asked Questions

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The final exam problems are variations on the homework, quizzes, lecture examples, and lecture previews.

Past exams (and answer keys) are on-line. Do 7-10 previous exams: allow 1 hour (half time) and work through , grade yourself, update note sheet, and repeat.

- I'm worried about my grade. Should I do Credit/NoCredit?

It's fine with us, but check with your advisor to make sure it's accepted for your program of study.

Today's Topics

```
//Another C++ program, demonstrating I/O & arithmetic
#include <iostream>
using namespace std;

int main ()
{
    float kg, lbs;
    cout << "Enter kg: ";
    cin >> kg;
    lbs = kg * 2.2;
    cout << endl << "Lbs: " << lbs << "\n\n";
    return 0;
}
```

- Recap: I/O & Definite Loops in C++
- Conditionals in C++
- Indefinite Loops in C++
- Recap: C++ & Python

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Recap: Basic Form & I/O in C++

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Recap: Basic Form & I/O in C++

- Efficient for systems programming.

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Recap: Basic Form & I/O in C++

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Recap: Basic Form & I/O in C++

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- Must declare variables:

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`#include <iostream>
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- To use those I/O functions:

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#include <iostream>
using namespace std;
```
- Definite loops:

```
for (i = 0; i < 10; i++) {...}
```
- Blocks of code uses '{' and '}'.

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- To print: `cout << "Hello!!";`
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- To use those I/O functions:
`#include <iostream>
using namespace std;`
- Definite loops:
`for (i = 0; i < 10; i++) {...}`
- Blocks of code uses '{' and '}'.
- Commands generally end in ';'.

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    cout << "Enter kg: ";
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Today's Topics

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- Recap: I/O & Definite Loops in C++
- **Conditionals in C++**
- Indefinite Loops in C++
- Recap: C++ & Python

Challenge:

Predict what the following pieces of code will do:

```
//Demonstrates conditionals
#include <iostream>
using namespace std;

int main ()
{
    int yearBorn;
    cout << "Enter year born: ";
    cin >> yearBorn;
    if (yearBorn < 1946)
    {
        cout << "Greatest Generation";
    }
    else if (yearBorn <= 1964)
    {
        cout << "Baby Boomer";
    }
    else if (yearBorn <= 1984)
    {
        cout << "Generation X";
    }
    else if (yearBorn <= 2004)
    {
        cout << "Millennial";
    }
    else
    {
        cout << "TBD";
    }

    return 0;
}
```

```
using namespace std;

int main ()
{
    string conditions = "blowing snow";
    int winds = 100;
    float visibility = 0.2;

    if ( (winds > 35) && (visibility < 0.25) )
        (conditions == "blowing snow") ||
        (conditions == "heavy snow") )
    cout << "Blizzard!\n";

    string origin = "South Pacific";

    if (winds > 74)
        cout << "Major storm, called a ";
    if ((origin == "Indian Ocean")
        ||(origin == "South Pacific"))
        cout << "cyclone.\n";
    else if (origin == "North Pacific")
        cout << "typhoon.\n";
    else
        cout << "hurricane.\n";
```

C++ Demo

```
//Demonstrates conditionals
#include <iostream>
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    }
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        cout << "Millennial";
    }
    else
    {
        cout << "TBD";
    }

    return 0;
}
```

(Demo with [onlinedgdb](#))

Conditionals

General format:

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#include <iostream>
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int main ()
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    }
    else if (yearBorn <= 2004)
    {
        cout << "Millennial";
    }
    else
    {
        cout << "TBD";
    }
    return 0;
}
```

```
if ( logical expression )
{
    command1;
    ...
}

else if ( logical expression )
{
    command1;
    ...
}

else
{
    command1;
    ...
}
```

Logical Operators in C++

Very similar, just different names: `&&`, `||`, and `!`:

Logical Operators in C++

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and (`&&`)

in1	in2	<i>returns:</i>
False	<code>&&</code>	False
False	<code>&&</code>	True
True	<code>&&</code>	False
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Logical Operators in C++

Very similar, just different names: `&&`, `||`, and `!`:

and (`&&`)

in1		in2	<i>returns:</i>
False	<code>&&</code>	False	False
False	<code>&&</code>	True	False
True	<code>&&</code>	False	False
True	<code>&&</code>	True	True

or (`||`)

in1		in2	<i>returns:</i>
False	<code> </code>	False	False
False	<code> </code>	True	True
True	<code> </code>	False	True
True	<code> </code>	True	True

Logical Operators in C++

Very similar, just different names: `&&`, `||`, and `!`:

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in1		in2	<i>returns:</i>
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or (`||`)

in1		in2	<i>returns:</i>
False	<code> </code>	False	False
False	<code> </code>	True	True
True	<code> </code>	False	True
True	<code> </code>	True	True

not (`!`)

	in1	<i>returns:</i>
!	False	True
!	True	False

Today's Topics

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}
```

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Challenge:

Predict what the following pieces of code will do:

```
//While Growth Example
#include <iostream>
using namespace std;

int main ()
{
    int population = 100;
    int year = 0;
    cout << "Year\tPopulation\n";
    while(population < 1000)
    {
        cout << year << "\t\t" << population << "\n";
        population = population * 2;
        year++;
    }
    return 0;
}
```

C++ Demo

```
//While Growth Example
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int main ()
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    int population = 100;
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    }
    return 0;
}
```

(Demo with onlinegdb)

Indefinite Loops: while

```
///While Growth Example
#include <iostream>
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int main ()
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    int year = 0;
    cout << "Year\tPopulation\n";
    while(population < 1000)
    {
        cout << year << "\t\t" << population << "\n";
        population = population * 2;
        year++;
    }
    return 0;
}
```

General format:

```
while ( logical expression )
{
    command1;
    command2;
    command3;
    ...
}
```

Challenge:

Predict what the following piece of code will do:

```
//Demonstrates loops
#include <iostream>
using namespace std;

int main ()
{
    int num;
    cout << "Enter an even number: ";
    cin >> num;
    while (num % 2 != 0)
    {
        cout << "\nThat's odd!\n";
        cout << "Enter an even number: ";
        cin >> num;
    }
    cout << "You entered: "
        << num << ".\n";
    return 0;
}
```

C++ Demo

```
//Demonstrates loops
#include <iostream>
using namespace std;

int main ()
{
    int num;
    cout << "Enter an even number: ";
    cin >> num;
    while (num % 2 != 0)
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        cout << "\nThat's odd!\n";
        cout << "Enter an even number: ";
        cin >> num;
    }
    cout << "You entered: "
        << num << ".\n";
    return 0;
}
```

(Demo with onlinegdb)

Indefinite Loops: while

```
//Demonstrates loops
#include <iostream>
using namespace std;

int main ()
{
    int num;
    cout << "Enter an even number: ";
    cin >> num;
    while (num % 2 != 0)
    {
        cout << "\nThat's odd!\n";
        cout << "Enter an even number: ";
        cin >> num;
    }
    cout << "You entered: "
        << num << ".\n";
    return 0;
}
```

General format:

```
while ( logical expression )
{
    command1;
    command2;
    command3;
    ...
}
```

Challenge:

Predict what the following pieces of code will do:

```
//Demonstrates do-while loops
#include <iostream>
using namespace std;

int main ()
{
    int num;
    do
    {
        cout << "Enter an even number: ";
        cin >> num;
    } while (num % 2 != 0);

    cout << "You entered: "
        << num << ".\n";
    return 0;
}
```

C++ Demo

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//Demonstrates do-while loops
#include <iostream>
using namespace std;

int main ()
{
    int num;
    do
    {
        cout << "Enter an even number: ";
        cin >> num;
    } while (num % 2 != 0);

    cout << "You entered: "
        << num << ".\n";
    return 0;
}
```

(Demo with onlinegdb)

Indefinite Loops: do-while

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//Demonstrates do-while loops
#include <iostream>
using namespace std;

int main ()
{
    int num;
    do
    {
        cout << "Enter an even number: ";
        cin >> num;
    } while (num % 2 != 0);

    cout << "You entered: "
        << num << ".\n";
    return 0;
}
```

General format:

```
do
{
    command1;
    command2;
    command3;
    ...
} while ( logical expression );
```

Today's Topics

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//Another C++ program, demonstrating I/O & arithmetic
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int main ()
{
    float kg, lbs;
    cout << "Enter kg: ";
    cin >> kg;
    lbs = kg * 2.2;
    cout << endl << "Lbs: " << lbs << "\n\n";
    return 0;
}
```

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- **Recap: C++ & Python**

Recap: C++ Control Structures

- I/O:

```
//Another C++ program; Demonstrates loops
#include <iostream>
using namespace std;

int main ()
{
    int i,j;
    for (i = 0; i < 4; i++)
    {
        cout << "The world turned upside down...\n";
    }

    for (j = 10; j > 0; j--)
    {
        cout << j << " ";
    }
    cout << "Blast off!!" << endl;
    return 0;
}
```

Recap: C++ Control Structures

- I/O: `cin >> ...;`

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Recap: C++ Control Structures

- I/O: `cin >> ...;` & `cout << ...;`

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    cout << "Blast off!!" << endl;
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Recap: C++ Control Structures

- I/O: `cin >> ...;` & `cout << ...;`
- Definite loops:

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    cout << "Blast off!!" << endl;
    return 0;
}
```

Recap: C++ Control Structures

- I/O: `cin >> ...;` & `cout << ...;`

- Definite loops:

```
for (i = 0; i < 10; i++)  
{  
    ...  
}
```

```
/*Another C++ program; Demonstrates loops  
#include <iostream>  
using namespace std;  
  
int main ()  
{  
    int i,j;  
    for (i = 0; i < 4; i++)  
    {  
        cout << "The world turned upside down...\n";  
    }  
  
    for (j = 10; j > 0; j--)  
    {  
        cout << j << " ";  
    }  
    cout << "Blast off!!" << endl;  
    return 0;  
}
```

Recap: C++ Control Structures

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Recap: C++ Control Structures

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- Definite loops:

```
for (i = 0; i < 10; i++)  
{  
    ...  
}  
...
```

- Conditionals:

```
if (logical expression)  
{  
    ...  
}  
else  
{  
    ...  
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Recap: C++ Control Structures

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Recap: C++ Control Structures

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    return 0;  
}
```

Challenge: Definite Loops in Python & C++

- Rewrite this program in C++:

```
for i in range(2017, 2000, -2):
    print("Year is", i)
```

- Rewrite this program in Python:

```
#include <iostream>
using namespace std;
int main()
{
    for (int i = 1; i < 50; i++)
    {
        cout << i << endl;
    }
    return 0;
}
```

Challenge: Definite Loops in Python & C++

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```
for i in range(2017, 2000, -2):  
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for i in range(2017, 2000, -2):
    print("Year is", i)
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#include <iostream>
using namespace std;
int main()
{
    for (int i = 2017; i > 2000; i=i-2)
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```

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    }
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for i in range(1, 50):
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#include <iostream>
using namespace std;
int main()
{
    for (int i = 1; i < 50; i++)
    {
        cout << i << endl;
    }
    return 0;
}

for i in range(1, 50):
    print(i)
```

Challenge: Conditionals in Python & C++

- *Python: what is the output?*

```
year = 2016
if year % 4 == 0 and \
    (not (year % 100 == 0) or (year % 400 == 0)):
    print("Leap!!")
print("Year")
```

- *Write a C++ program that asks the user the number of times they plan to ride transit this week. Your program should then print if it is cheaper to buy single ride metro cards or 7-day unlimited card.
(The 7-day card is \$33.00, and the cost of single ride, with bonus, is \$2.75).*

Challenge: Conditionals in Python & C++

- *Python: what is the output?*

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year = 2016
if year % 4 == 0 and \
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    print("Leap!!")
print("Year")  year = 2016
```

```
if TRUE and \
    (not (year % 100 == 0) or (year % 400 == 0)):
    print("Leap!!")
print("Year")
```

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```
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if TRUE and \
    (not FALSE or (year % 400 == 0)):
    print("Leap!!")
print("Year")
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if TRUE and \
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print("Year")
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print("Year")
```

```
year = 2016
if TRUE:
    print("Leap!!")
print("Year")
```

Prints: Leap!
Year

Challenge: Conditionals in Python & C++

- Your program should then print if it is cheaper to buy single ride metro cards (\$2.75 per ride) or 7-day unlimited card (\$33.00).

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

Challenge: Conditionals in Python & C++

- Your program should then print if it is cheaper to buy single ride metro cards (\$2.75 per ride) or 7-day unlimited card (\$33.00).

```
#include <iostream>
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int main()
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    int rides;
```

Challenge: Conditionals in Python & C++

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```
#include <iostream>
using namespace std;
int main()
{
    int rides;
    cout << "Enter number of rides:";
```

Challenge: Conditionals in Python & C++

- Your program should then print if it is cheaper to buy single ride metro cards (\$2.75 per ride) or 7-day unlimited card (\$33.00).

```
#include <iostream>
using namespace std;
int main()
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    int rides;
    cout << "Enter number of rides:";
    cin >> rides;
```

Challenge: Conditionals in Python & C++

- Your program should then print if it is cheaper to buy single ride metro cards (\$2.75 per ride) or 7-day unlimited card (\$33.00).

```
#include <iostream>
using namespace std;
int main()
{
    int rides;
    cout << "Enter number of rides:";
    cin >> rides;
    if (2.75 * rides < 33.00)
```

Challenge: Conditionals in Python & C++

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    int rides;
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    if (2.75 * rides < 33.00)
    {
        cout << "Cheaper to buy single ride metro cards.\n";
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}
```

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    if (2.75 * rides < 33.00)
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    }
    else
    {
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    }
    return 0;
}
```

Challenge: Indefinite Loops in Python & C++

- Write Python code that repeatedly prompts for a non-empty string.
- Write C++ code that repeatedly prompts until an odd number is entered.

Challenge: Indefinite Loops in Python & C++

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Challenge: Indefinite Loops in Python & C++

- Write Python code that repeatedly prompts for a non-empty string.

```
s = ""
```

Challenge: Indefinite Loops in Python & C++

- Write Python code that repeatedly prompts for a non-empty string.

```
s = ""  
while s == "":
```

Challenge: Indefinite Loops in Python & C++

- Write Python code that repeatedly prompts for a non-empty string.

```
s = ""  
while s == "":  
    s = input("Enter a non-empty string: ")
```

Challenge: Indefinite Loops in Python & C++

- Write Python code that repeatedly prompts for a non-empty string.

```
s = ""  
while s == "":  
    s = input("Enter a non-empty string: ")  
print("You entered: ", s)
```

Challenge: Indefinite Loops in Python & C++

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while s == "":  
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int main()
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- Write C++ code that repeatedly prompts until an odd number is entered.

```
#include <iostream>  
using namespace std;  
int main()  
{  
    int num = 0;
```

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- Write Python code that repeatedly prompts for a non-empty string.

```
s = ""  
while s == "":  
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```

- Write C++ code that repeatedly prompts until an odd number is entered.

```
#include <iostream>  
using namespace std;  
int main()  
{  
    int num = 0;  
    while (num % 2 == 0)
```

Challenge: Indefinite Loops in Python & C++

- Write Python code that repeatedly prompts for a non-empty string.

```
s = ""  
while s == "":  
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- Write C++ code that repeatedly prompts until an odd number is entered.

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#include <iostream>  
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int main()  
{  
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    while (num % 2 == 0)  
    {  
        cout << "Enter an odd number:";
```

Challenge: Indefinite Loops in Python & C++

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Challenge: Indefinite Loops in Python & C++

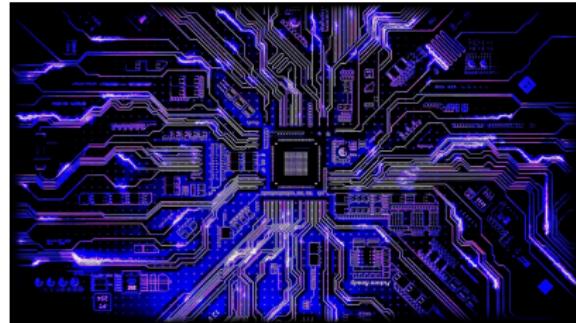
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{  
    int num = 0;  
    while (num % 2 == 0)  
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        cin >> num;  
    }  
    return 0;  
}
```

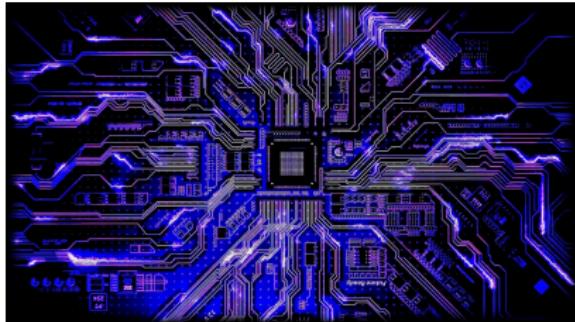
Weekly Reminders!



Before next lecture, don't forget to:

- Read and work through Lab 13!

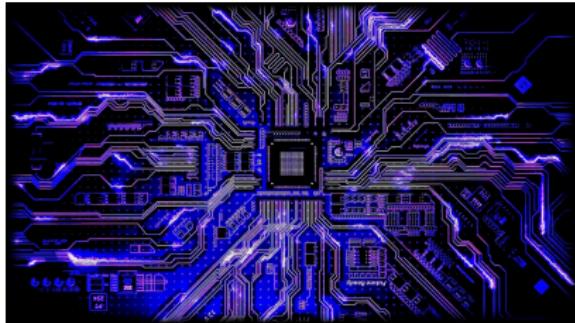
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Weekly Reminders!



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- If you need help, please email zs494@hunter.cuny.edu with questions