Baker's Dozen

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Aim: How can while loops make our code more efficient?

Agenda:
Motivation: Annoying task
(5 mins)
Mini-lesson: While Loop
(10 mins)
Groupwork: While Loop practice
(25 mins)
Closing: Answer the aim
(5 mins)

Motivation: Give students 3 minutes to accomplish this task
p5: Make an image with 30 evenly-spaced circles
Snap: Make an image with 30 evenly-spaced circles
Java: Print all the numbers from 1-30 on separate lines of code

Discuss: Did you finish in 3 minutes? How did you feel while you were doing this? This code is really inefficient– it's long and repetitive. We're going to look at another way to do this. What if I told you that I could make 100 circles/numbers in under 30 seconds?

Write code to make 100 circles. Bam.

Aim: How can loops make our code more efficient?

Mini-lesson:
Loop: Code that repeats a sequence of instructions

Show while loop example

Java

```
Int x=1;
while (x < 100){
        System.out.println(x);
        X = x+1;
}
```

JavaScript p5

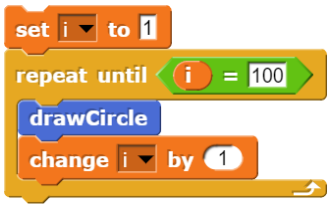
```
var x=50;
while (x < 100){
```

```
        ellipse(x,100,100)
        x = x + 50;
}
```

Python

```
x= 1
While x <100:
        print(x)
        x= x+ 1
```

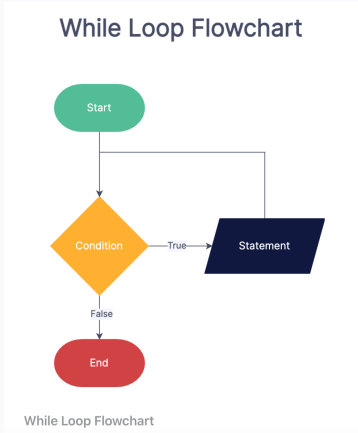
Snap!



Discuss structure:

Declare a variable
Check a condition
If it's true, do something and increase variable by 1 (50 for p5)
If it's false, stop and exit the loop.

Q: In this example, what is our condition?
Q: When is this condition true? When is it false?
Q: What would I change if I only wanted to print ten numbers/circles?



Groupwork:

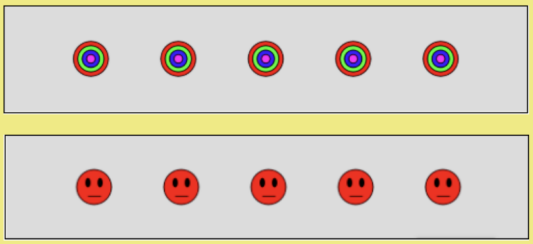
At some point it is likely that a student will create an infinite loop. When this happens: One common problem in CS is an infinite loop (where the loop keeps going forever and never stops). Did anyone else experience this? What causes an infinite loop to occur?

p5.js

Take a challenge!

Mild🌶 Challenge:

Recreate one of the following designs using a while loop.



Spicy🌶 🌶 🌶 Challenge:

- Try to make the ellipses start from the right side of the screen
- Space them 50px apart
- Draw ellipses only on the *left half* of the canvas (spaced as you wish!)

Leave some comments about what you attempt

Snap!

Part 1: Brick by Brick

1. Write a Snap! script to draw a single 20x10 "brick" in the lower left corner of the stage when the green flag is clicked.
2. Modify your script to draw two bricks side by side. The bricks should share a short edge, like this:

3. Now modify your script again to build a full row of bricks across the entire length of the stage. Use a loop to keep your script as concise as possible. Remember that the stage is 480 pixels wide.

Python:

As a group choose one of the following while loops;

- Repeatedly print the value of the variable xValue, decreasing it by 0.5 each time, as long as xValue remains positive.
- Print the value of the variable, the numbers 0 - 10, after its been multiplied by 3
- Repeats a block of code as long as the user indicate they want it to.
- Drive the user crazy by insisting they re-enter a particular input no matter what they enter. Be creative.

Java:

```
import java.io.*;
import java.util.*;

public class whileLoops{
  public static void main(String[] args){
    //Example code
    int x = 1;
    while (x< 100){
      System.out.println(x);
      x = x+1;
    }
    System.out.println();

    //1) Print out the numbers from 1-10:


    //2) Print out the word "Hello" five times


    //3) Print all of the even numbers from 0 to 20


    //4) Repeatedly print the value of a variable, decreasing it by 0.5 each time, as long as the variable remains positive.


    //5) CHALLENGE! Drive the user crazy by insisting they re-enter a particular input no matter what they enter. Be creative. (Hint: use the Scanner class to take in user input)
  }
}
```

Closing: Wrap up discussion -- emphasizing that iteration is a foundational part of CS, done so using while loops but they have some disadvantages (lead in to for loops).

Key Takeaways

While Loop
Uses a boolean condition to repeatedly run a block of code. If it is true it runs the block of code contained within it. This process of checking the condition and running the block of code is repeated as long as the Boolean condition remains true. Once the Boolean expression becomes false it will stop.

Next Lesson: For loops