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Programmed Universe

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First Journal Entry

Before we begin, let’s take a moment to record your thoughts and feelings this morning.

Journal Prompt: Why did you choose to enroll in Appetite for Android and What do you Hope to be able to Accomplish at the end of the Program?

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Welcome to Appetite for App Development!

Over the next five weeks you'll learn the programming language JAVA learn how to use android studio to program apps for Android phones and make awesome memories.

A Programmer is someone who writes computer programmer.
They think of ways to make a computer do a task for them so they don't have to do it again, make a game that they can play, or write programs to help them think about hard concepts (like math or physics or music).

By the end of this program you'll be able to call yourself a mobile developer!

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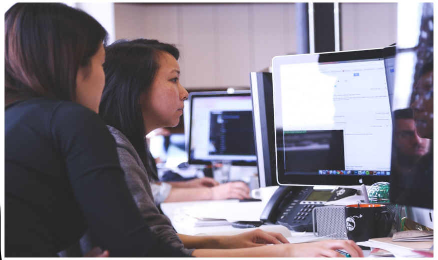
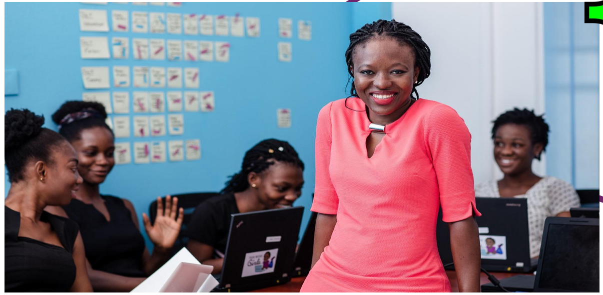
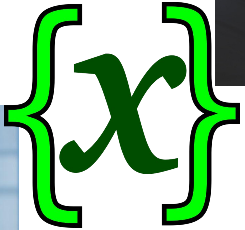
A Brief Overview of what we'll learn

- Variables
- Primitive Types
- Arrays
- Operations
- Loops
- Functions
- IF Statements
- Switches
- Object Oriented Programming
- And Concepts Special to Android Development

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Why Programming?

- Programs are instructions
- If we can instruct computers to do monotonous tasks then that has the potential to allow people to be more creative in their daily lives
- Coders have the unique opportunity to raise the standard of living for people around the planet
- It’s challenging, but fun!
- Developers never get bored because there’s always some new problem to solve
- It’s more than sitting at a desk in front of a computer, software engineers need to collaborate in order to accomplish big goals.

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Developer Jargon

Every industry has its jargon and coding is no exception. By the end of this program you should feel comfortable using the jargon of programmers...because you will be a programmer! :)
Here are a few of the most common jargon terms:

- **Input: a value that goes into a program**
- **Output: a value that comes out of a program**
- **I/O: Input/Output**
- **Foo/foobar: a filler word(s)**
- **Syntax: The punctuation of a machine language (precision required)**

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Things to remember when coding

- **Between you and the computer, you are the smart one.**
- **Computers are dumb, they only do what their programs tell them to do.**
- **Even AI is not all that smart**
- **Computers are fast, they are good at completing repetitive tasks**
- **If you get frustrated stand up and stretch, take a short walk if you need to**
- **Learning something new can be a challenge, but also very rewarding Have fun!**

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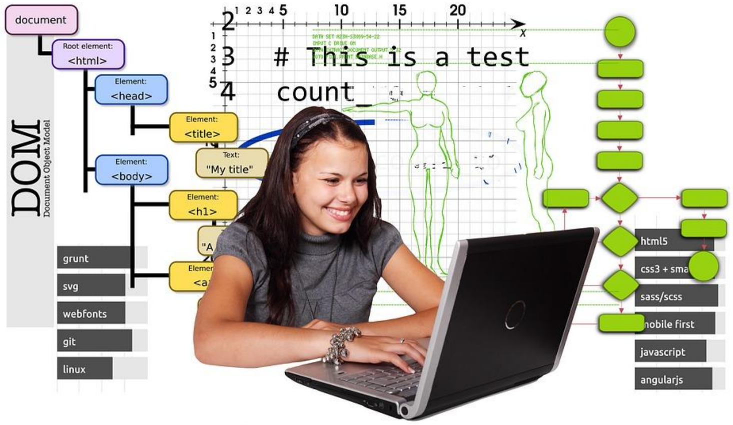
How Can I Learn How to Program Computers?

- This class!
- Practice, Practice, Practice!
- Talk about it with friends that also like computers, coding and technology.
- Build something with your friends.



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We’re Going to Code a Game Soon, but first…

Let’s consider a few of the most basic development concepts so we can build a game in Scratch.

There are four concepts that we should briefly cover:

- **Variables**
- **Operations**
- **If Statements**
- **Loops**

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Variables

Variables are storage containers. They hold information that we can use later.

For example, we can create a variable called score and give it a value.

```
score = 0
```

Then later, we can use score to track an element in our game.

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Variables Practice

Can you think of some variables in your life?

Take a moment and write down a few variables and pair them with their current values. I'll offer a couple to help you get started…

```
age = 17;
school = “Madison High School”;
occupation = “Student”;
```

Now it's your turn, think of other variables that you could apply to yourself and write them down in the format shown above.

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Operations

Operations are associated with mathematical operations such as plus, minus, greater than, lesser than and equal to. Programming languages use mathematical symbols to indicate operations. For example:

```
Greater than = >           Greater than or equal to >=
Less than = <              Less than or equal to <=
Equal = ==                 (Assigning values is the single “=” sign)
And = &&                   Or = ||                    Not !=
Add = +                    Subtract = -
```

Variables and Operations together

We can mix variables with operations to manipulate operations:

```
score = 0 // Assign the variable score the number zero
score = score + 1 // score will now equal 1
score = score - 1 // score would again equal 0
```

Comparisons

We can also compare values with the operators. Something called a boolean will tell us if a comparison is true or false.

```
score = 10 // Assign the variable score the number ten
score < 100 // true
score > 15 // false
```

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If Statements

“If statements” create conditions that determine different outputs

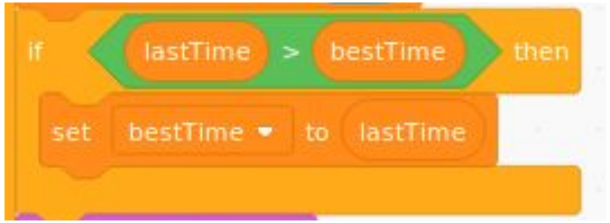
In Java an if statement looks something like this:

```
If (condition) {
  // do something
}
```

That may not be very helpful so we’ll show you an if statement in Scratch and then some real if statement examples...

If Statements

This is what an if statement looks like in Scratch:



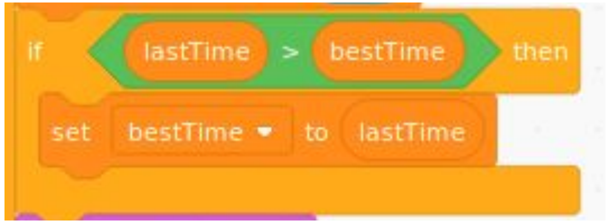
```
if lastTime > bestTime then
  set bestTime to lastTime
```

This statement has a condition of the variable “lastTime” being greater than the variable “bestTime.” If the condition is true then the programs sets, or changes, the variable “bestTime” to equal the variable “lastTime”.
If the condition is false then the program ignores the if statement.

If Statements

If we wrote that same statement in Java it would look like this:

```
if (lastTime > bestTime) {
  bestTime = lastTime;
}
```



Again, if the lastTime variable is greater than the bestTime variable then assign that value in lastTime to the bestTime variable.

What if we wanted to have more than one condition inside the if statement?

We can do that with “else”!

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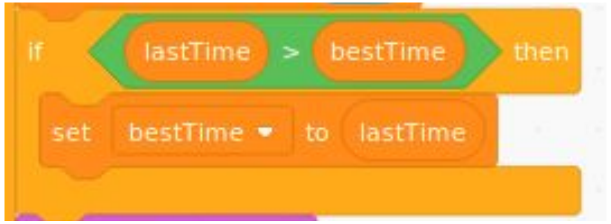
If-Else Statements

If we wanted to add a false statement command (the opposite of lastTime being greater than bestTime) we can do that with the "else" keyword:

```
if (lastTime > bestTime) {
  bestTime = lastTime;
} else {
  bestTime = bestTime;
}
```


```
if lastTime > bestTime then
  set bestTime to lastTime
```

So now, we are explicitly stating that if lastTime is NOT greater than bestTime then bestTime will continue to be assigned it's current value.

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If-else if-else Statements

Let’s look at one more if statement with multiple conditions. This is called the if-else-if ladder because the program can “climb” through the conditions until it finds a match.

```
if (grade >= 90) {
  score = ‘A’;
} else if (grade >= 80) {
  score = ‘B’;
} else if (grade >= 70) {
  score = ‘C’;
} else {
  score = ‘D’;
}
```

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If-else Practice

Let’s practice if statements by writing one that applies to your life. For example, we could write an if statement about your birthday to increase your age.

```
age = 17;
month = “July”;

if (month = “August”) {
  age = age + 1;
}
```

`Write this statement for practice and then think of your own if/else if statement that you can write.`

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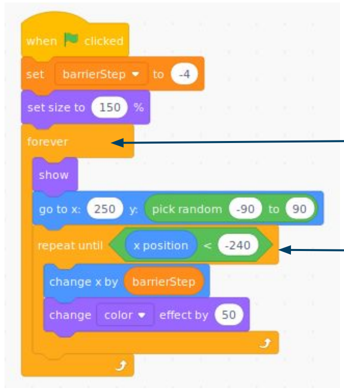
Loops

Loops are what they sound like. They are a way to instruct a program to repeat itself. There are a few different types of loops, but they all accomplish the same thing: they make programs repeat a specific set of instructions until a condition is met.

Here's an example of a loop, actually two, in Scratch:



```
when ⚑ clicked
set barrierStep ▾ to -4
set size to 150 %
forever
  show
  go to x: 250 y: pick random -90 to 90
  repeat until x position < -240
    change x by barrierStep
    change color ▾ effect by 50
```

The forever loop repeats until the program stops. Sometimes we call this an infinite loop

The "repeat until" loop tells the program to repeat the instructions until a condition is met or broken

Loops

Loops in Java include for loops, while loops and do while loops. There are also infinite loops, but these are usually the result of a programmer making a mistake.

For loops are the most common types of loops. In Java they might look like:

```
for (initialization condition; testing condition; increment/decrement) {
  Statement; // this is the do something part
}

for (i = 0; i <= 10; i++) {
  system.out.println(“i = ” + i); //a command that tells Java to print the value of i
}
```

Print is a word that means display

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Loops

Let’s write a few loops for practice. Our command statements for this exercise don’t have to be perfect. Here’s an example involving folding laundry:

```
for (clothes = 30; i == 0; i--) {
  clothes.fold();
}
```

Here’s another for brushing your teeth:

```
for (teeth = 0; i == 32; i++) {
  teeth.brush();
}
```

Ready to Code!

Great work! We are ready to begin creating on our first game in Scratch with our new understanding of these basic programming concepts. We'll cover all of these concepts again in more detail, but for now, what you know should be sufficient.

If you have any questions now is a good time to ask. It's important we all understand how the concepts of variables, operators, if statements and loops work together to build a program.

Introduction to Scratch

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Let’s Build a Game!

Instructor, please begin “Fly Gal” Slideshow.

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