Summary – 4/9/2011

- Built circuits
- Used digital input and output devices
- Learned about the button
- Printed output to the computer
- Learned binary numbers
- Reminder: only one setup() and one loop()
void setup() {
  Serial.begin(9600);
}

void loop() {
  Serial.println(??????, DEC);
}
Reading a Button

```c
const int button = 2; //const means no change

void setup() {
  pinMode(button, INPUT);
}

void loop() {
  int buttonState = digitalRead(button);
}
```
void setup() {
    Serial.begin(9600);
}

void loop() {
    Serial.println(buttonState, DEC);
}
If Statements

- Conditions that are evaluated
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How would that look in code?

```java
int umbrellaState = 0;
if (weather == rainy) {
    umbrellaState = 1;
} else {
    umbrellaState = 0;
}
```

0 = false

1 = true
int glassesState = 0;
if (weather != sunny) {
glassesState = 0;
} else {
glassesState = 1;
}
Quick Pitch on Variable Names

- Start with lower case letters only
  - No numbers, characters, uppercase
- Extra words in a variable start with uppercase
  - e.g. myFirstVariable
- Variables can have numbers
  - e.g. button1
- Variables can have underscores
  - e.g. my_variable
Detecting weather change
Detecting weather change

- We need two variables!
Detecting weather change

- We need two variables!
  - weatherState
Detecting weather change

- We need two variables!
  - weatherState
  - lastWeatherState
How would this look in code?

```java
int weatherState = sunny;
int lastWeatherState = sunny;

Loop:
weatherState = read(weather);
if(weatherState != lastWeatherState) {
    if(weatherState == sunny) {
        "The weather heated up"
        lastWeatherState = sunny;
    } else {
        "The weather cooled down"
        lastWeatherState = rainy;
    }
}
```
int weatherState = sunny;
int lastWeatherState = sunny;

Loop:
weatherState = read(weather);
if(weatherState != lastWeatherState) {
    if(weatherState == sunny) {
        "The weather heated up"
        lastWeatherState = sunny;
    } else {
        "The weather cooled down"
        lastWeatherState = rainy;
    }
}
int weatherState = sunny;
int lastWeatherState = sunny;

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    if(weatherState == sunny) {
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How would this look in code?

```cpp
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int lastWeatherState = sunny;

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    if(weatherState == sunny) {
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        lastWeatherState = sunny;
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        "The weather cooled down"
        lastWeatherState = rainy;
    }
}
```
Weather Change

int weatherState = sunny;
int lastWeatherState = sunny;

Loop:
weatherState = read(weather);
if(weatherState != lastWeatherState) {
    if(weatherState == sunny) {
        "The weather heated up"
        lastWeatherState = sunny;
    } else {
        "The weather cooled down"
        lastWeatherState = rainy;
    }
}
Brackets and Indentation

- Enclose content in {}
  - setup(), loop(), and if statements
- Content in {} should be indented
  - loop() {
    - if(x == y) {
      - Serial.println("x and y are the same!");
    }
  }

- Enclose content in {}
Mathematics and Variables

- Increment variable x by 1
  - \( x = x + 1; \)
- Decrement variable x by 1
  - \( x = x - 1; \)
- Multiply variable x by 2
  - \( x = x \times 2; \)
- Divide variable x by 2
  - \( x = x / 2; \)
  - When x is an integer \([..., -2, -1, 0, 1, 2, ...]\)
  - ignore remainder (e.g. \(5/2 = 2\))
ButtonCount

Computer prints number of button presses in binary