

Arduino Programming – Part 5: User-defined functions

ME 120

Mechanical and Materials Engineering

Portland State University

<http://web.cecs.pdx.edu/~me120>

User-Defined Function

- What is it? → A user-defined function is a function that you write yourself. Opposite to Built-in functions such as digitalWrite, delay, etc..
- Why? → to simplify and organize your code.
- How? → Built your function outside of your void loop and void setup. Call it from anywhere. It will be treated like a built-in function.

Example: Countdown

- You would like to built a countdown from 10 to 0 that you could see on your serial monitor.
- Without creating any function, the code is:

```
void setup() {
  Serial.begin(9600);           //Initialize serial port communication
  int i;
  for (i=10; i>=0; i--){       //goes from 10 to 0, decrement of 1
    Serial.println(i);         //print the value of i on serial monitor
    delay(1000);               //wait 1 sec between each value
  }
}

void loop() {
}
```

Example: Countdown

- Let's built a function that we call "countdown"

```
void setup() {  
    Serial.begin(9600);           //Initialize serial port communication  
    countdown();                 // call the function countdown  
}  
  
void loop() {  
  
  
void countdown() {               // create the function countdown  
    int i;  
    for (i=10; i>=0; i--){  
        Serial.println(i);  
        delay(1000);  
    }  
}
```

Example: Countdown

- Let's add a parameter: the value of the countdown start

```
void setup() {
  Serial.begin(9600);           //Initialize serial port communication
  countdown(15);               // call the function countdown
}

void loop() {
}

void countdown(int start) {
  int i;
  for (i=start; i>=0; i--){
    Serial.println(i);
    delay(1000);
  }
}
```

Example: Countdown

- Let's add a second parameter: the value of the time delay between the counts

```
void setup() {
  Serial.begin(9600);           //Initialize serial port communication
  countdown(15, 2000);         // call the function countdown
}

void loop() {
}

void countdown(int start, int deltaT){
  int i;
  for (i=start; i>=0; i--){
    Serial.println(i);
    delay(deltaT);
  }
}
```

Example: Countdown

- We want to know the sum of all the numbers counted in the countdown.

```
void setup() {
  Serial.begin(9600);
  int result;
  result = countdown(15, 2000);
}

void loop() {
}

int countdown(int start, int deltaT){
  int i;
  int sum=0;
  for (i=start; i>=0; i--){
    Serial.println(i);
    delay(deltaT);
    sum = sum+i;
  }
  return (sum);
}
```

Summary of user-defined functions

- You chose the name
 - ❖ Make sure the name is not already used
- You chose the type of return value
- You choose the number and type of inputs
 - ❖ Input types are declared in the function definition
- `int countdown(int start, int deltaT) {...}`
 - ❖ Input variables are used in the body of the function
- Variables in the function are local
 - ❖ Calling function is not affected by local variables and logic in the function