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CPE 301-1001
Assignment #5
October 13, 2016

Assignment Description:

This lab is meant to give us a quick and simple introduction to coding programs for the arduino using the arduino IDE. It will also show us how to debug through multiple examples.

Problems Encountered:

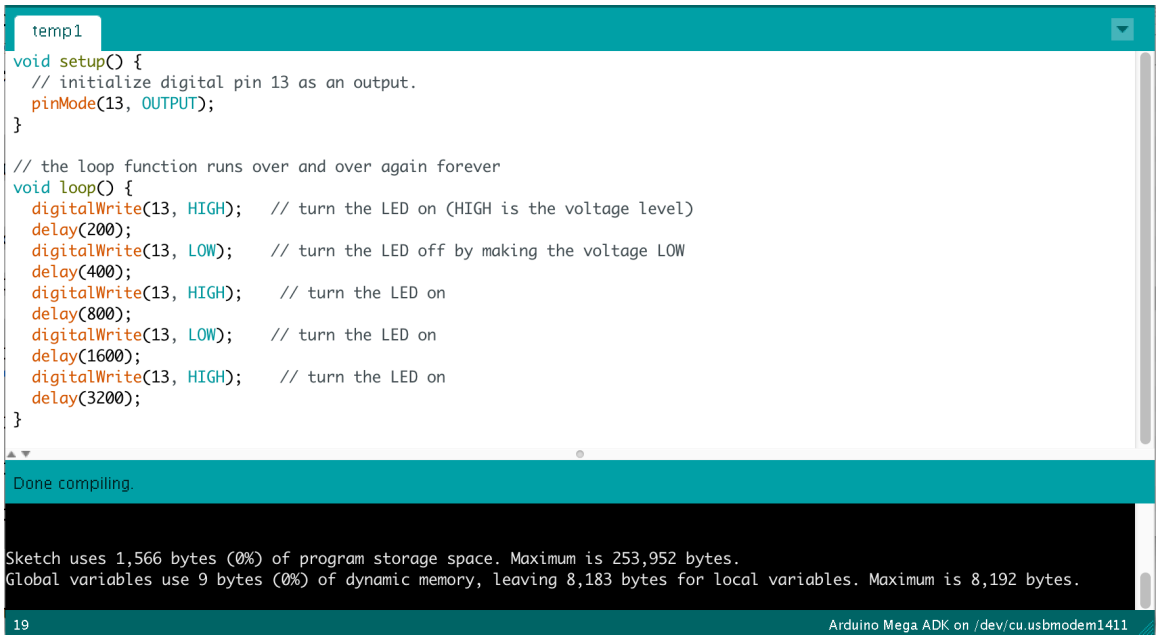
I could not for the life of me understand what 4.4 even wanted to do in the loop. I asked both Lab Assistants and I still didn't understand what needed to happen.

Lessons Learned:

I learned how to print to the serial monitor which will undoubtedly come in handy while debugging/testing devices and boards in the future.

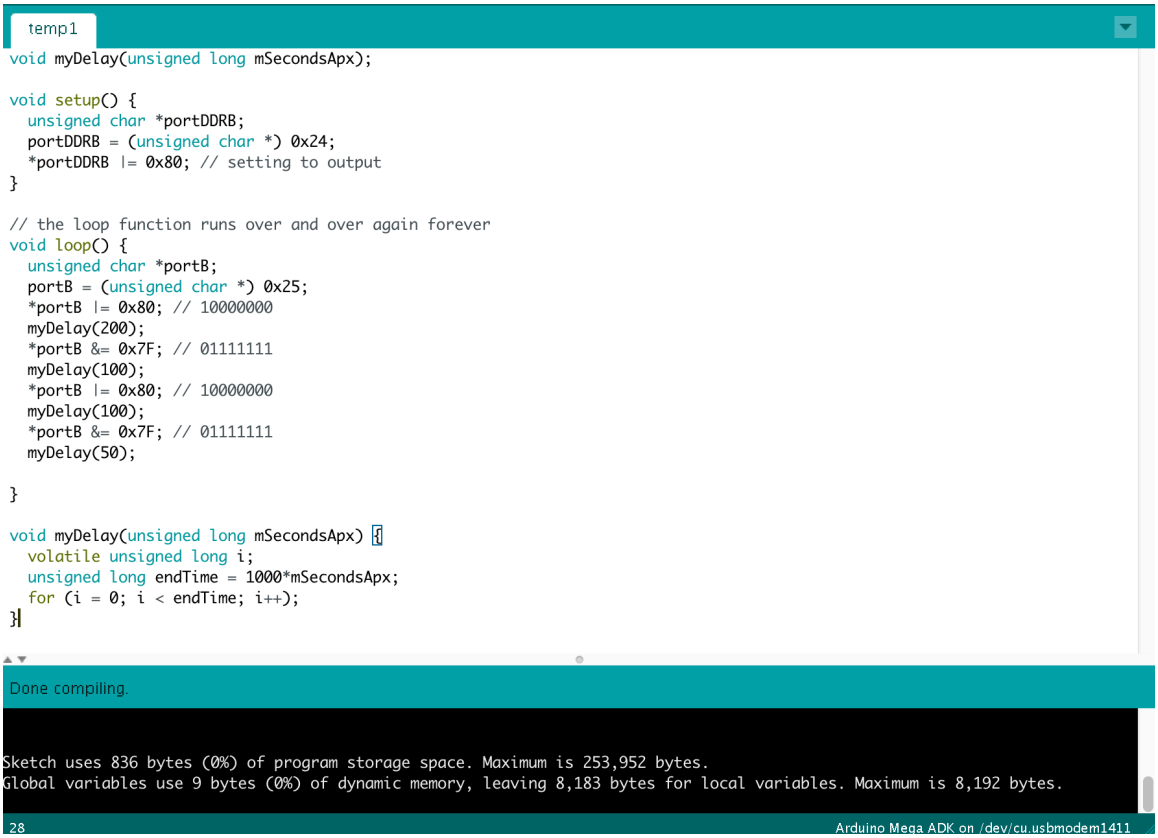
Description of Completed Lab:

3.1) Below is the code of the altered blink example. I am only using the predefined functions because I was explicitly told to. I simply made a new blink sequence. Interesting right?



3.2) The program uses 1566 bytes of program storage space & 9 bytes of dynamic memory.

3.3) Below is the ansi-c version of blink, with an *interesting* pattern implemented.



3.4) The program uses 836 bytes of program storage space & 9 bytes of dynamic memory.

4.1) Below the program has been debugged.

temp1

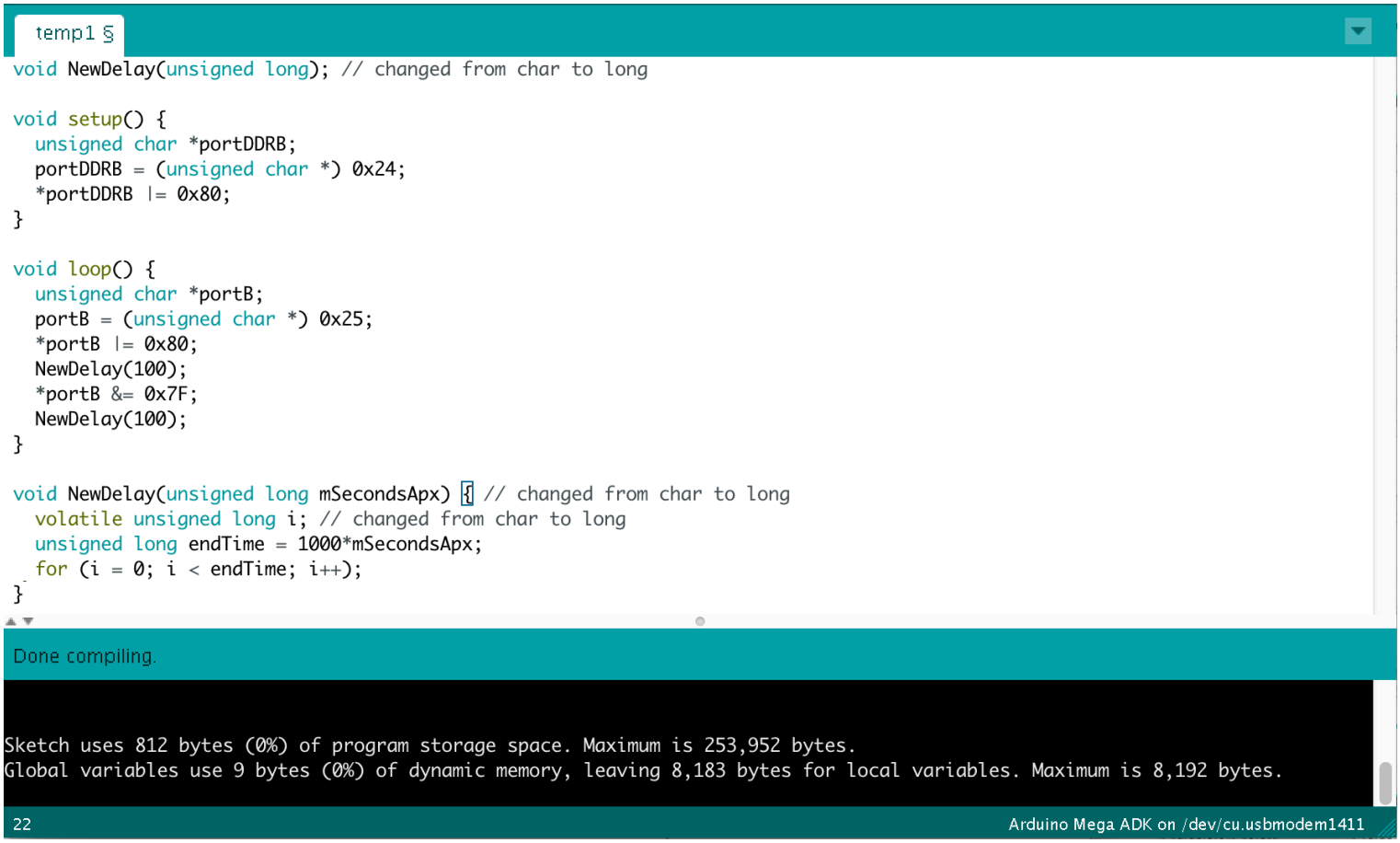
```
void myDelay(unsigned long);

void setup() {
  unsigned char *portDDRB;
  portDDRB = (unsigned char *) 0x24;
  *portDDRB |= 0x80; // setting to output
}

// the loop function runs over and over again forever
void loop() {
  unsigned char *portB;
  portB = (unsigned char *) 0x25;
  *portB |= 0x80;
  myDelay(1000); // REPLACED {}s with ()
  *portB &= 0x7F; // replaced : with ;
  myDelay(1000);// REPLACED {}s with (), removed ,

}

void myDelay(unsigned long mSecondsApx) {
  volatile unsigned long i;
  unsigned long endTime = 1000*mSecondsApx;
  for (i = 0; i < endTime; i++);
}
```

Done compiling.

```
Sketch uses 812 bytes (0%) of program storage space. Maximum is 253,952 bytes.
Global variables use 9 bytes (0%) of dynamic memory, leaving 8,183 bytes for local variables. Maximum is 8,192 bytes.
```

24 Arduino Mega ADK on /dev/cu.usbmodem1411

4.2) Below the program has been debugged.



4.3) The issues are commented inline, I had to change the char being passed to a long, and inside the function I also had to change that. (wrong data types).

4.4) The below program has been fixed. With no description of what it wanted to do and with the math being atrociously bad within the function, I have simply removed the garbage code by commenting it out.

temp1

```
void NewDelay(unsigned long);

void setup() {
  unsigned char *portDDRB;
  portDDRB = (unsigned char *) 0x24;
  *portDDRB |= 0x80;
  Serial.begin(9600);
}

void loop() {
  unsigned char *portB;
  portB = (unsigned char *) 0x25;
  *portB |= 0x80;
  NewDelay(100);
  *portB &= 0x7F;
  NewDelay(100);
}

void NewDelay(unsigned long mSecondsApx) {
  volatile unsigned long i;
  unsigned long j;
  unsigned long k;
  unsigned long endTime = 100 * mSecondsApx;

  for (i = 0; i < endTime; i++) { // The content of this loop was dividing by 0, I removed the content.
//    j = 10;
//    do {
//      j = j - 1;
//      k = i / j; // this eventually divides by 0 (bad).
//    } while (k > 1);
  }
}
```

Done compiling.

```
Sketch uses 2,130 bytes (0%) of program storage space. Maximum is 253,952 bytes.
Global variables use 182 bytes (2%) of dynamic memory, leaving 8,010 bytes for local variables. Maximum is 8,192 bytes.
```

33 Arduino Mega ADK on /dev/cu.usbmodem1411

4.5) It was dividing by zero in the do-while loop eventually, so I commented it out.

4.6) Debugged program below.

temp1

```
void NewDelay(unsigned long);

void setup() {
  unsigned char *portDDRB;
  portDDRB = (unsigned char *) 0x24;
  *portDDRB |= 0x80;
}

void loop() {
  unsigned char *portB;
  portB = (unsigned char *) 0x25;
  *portB |= 0x80;
  NewDelay(100);
  *portB &= 0x7F;
  NewDelay(100);
}

void NewDelay(unsigned long mSecondsApx) {
  volatile unsigned long i;
  unsigned long j = 0;
  unsigned long endTime = 100 * mSecondsApx;

  i = 0;
  while (j==0) {
    i++;
    if (i == endTime) {
      j = 1;
    }
  }
}
```

Done compiling.

```
Sketch uses 810 bytes (0%) of program storage space. Maximum is 253,952 bytes.
Global variables use 9 bytes (0%) of dynamic memory, leaving 8,183 bytes for local variables. Maximum is 8,192 bytes.
```

1 Arduino Mega ADK on /dev/cu.usbmodem1411

4.7) = should be == when comparing. This was the error in the program. I also changed j to a long, which better characterizes what it will be used for, even though this is not necessary in this example.