E85: Digital Design and Computer Engineering
Problem Set 8

1) Assembly Language Programming
   Translate the following code snippet into ARM assembly language.

```
unsigned int a[10]; // assume base address of a is in R4
unsigned int tmp; // assume tmp is in R5
int i, j; // assume i and j are in R6 and R7, respectively

for (i=1; i<10; i++)
    for (j=0; j<i; j++)
        if (a[i] > a[j]) {
            tmp = a[i];
            a[i] = a[j];
            a[j] = tmp;
        }
```

2) Writing a Function in Assembly Language
   Do Exercise 6.25(a) from the textbook.

3) Assembly Language to Machine Language
   Translate the following assembly language code to ARM machine language:

```
Loop
CMP R1, R2
BEQ Done
ADD R1, R1, #1
B Loop
Done
```

4) Machine Language to Assembly Language
   Translate the following machine language code to ARM assembly language:

```
E7904302
B381302A
```

   Note that the textbook appendix is in error for memory instructions with register offsets: bit 4 of the instruction should be 0.

5) Impact on Society: Research and write a paragraph biography about a person who contributed to the development of digital technology. What made her/his achievements notable at the time? In what ways did the person's work lead to positive or negative societal change?

How long did you spend on this problem set? This will not count toward your grade but will help calibrate the workload.