CS 91S: Games Systems

Assignment 3: Introduction to 6502 Assembly

DUE February 3rd at 11:59 PM

There are three parts to this lab:

1. a few short answer questions;
2. some number representation refresher exercises;
3. an open-ended snake game challenge.

1 Getting to Know the 6502

Answer the following questions in a sentence (or two):

1. How many REGISTERS does the 6502 have?
2. What does `JMP` do? How does it differ from `BNE`?
3. What does `JSR` differ from `JMP`?
4. Is the 6502 little-endian? What does that mean?
5. How much memory can the 6502 access (in bytes)?
6. How many addressing modes does the 6502 use?
7. What's the point of the `ZERO_PAGE`?

2 Computer Number Systems

Fill in the following tables.

2.1 One unsigned byte: 8-bits

Decimal	Binary	Hex
5	0000 0101	0x05
84		0x54
		0xFE
255		
	0000 0000	
	1000 1111	
127		

2.2 A signed byte: 2's complement

Decimal	Binary	Hex
5	0000 0101	0x05
-5		
	1111 1111	0xFF
84		
127		
-127		
-84		
	0000 0000	
1		
-1		

2.3 8-bit BCD

Decimal	Binary	Hex
55	0101 0101	0x55
27		
	0000 0000	
50		
85		
99		

2.4 8-bit Fixed-point (with a scaling factor of 2^4 = 16)

Decimal	Binary	Hex
1	0001 0000	0x10
1.5		
1.75		
	0000 0001	0x01
8.5		
	0000 0000	

2.5 Bonus

Write out the binary (and hex) representations for the numbers above in some other number system, e.g., a Negative Base, Ternary, Floating Point, or Cistercian Numerals.

3 SNAKE

Follow the 6502 tutorial and modify the snake game in inventive ways. Some suggestions:

- change the color of the snake;
- change the color of the apple;
- make the apple move;
- change the keys used to control the snake;
- add an additional apple to eat;
- add a second parallel snake controlled the same way, but at a different initial starting location;
- add a second snake with different controls;
- some other Pippin Barr style *snakism*.

Write about what you attempted, what you accomplished, and include your snake program as a file `snake.s`.