COMP 273 – Assignment 1

1. In hardware, there is no type information stored in a byte. Type, like file extension, is purely for humans. Determining whether 8 random bits represent an integer or a character is therefore impossible.

2.
```
#include <string.h>

int main(){
      char *p = 52;
      char address[5];
      char loadCommand[20];

      while ( *p != '\0' ) {
            strcpy(loadCommand, "load register, ");

            \\ first convert address to string
            sprintf(address, "%d", p);

            \\ then concatenate to make "load register, [address]"
            strcat(loadCommand, address);

            \\ call CPU commands
            system(loadCommand);
            system("save register, 1");

            p++;
      }

      return 0;
}
```

3. a. $1023_{10} = 1111111111_2 = 1777_8$

b. $10110110_2 = 182_{10} = B6_{16}$

4. $00110110_2 + 01111001_2 - 00001100_2$
$= 10101111_2 - 01111001_2$ (**signed overflow:** the result of the 1st addition is negative)
$= 10101111_2 + 11110100_2$ (2's complement)
$= 10100011_2$ (**overflow:** 1 bit was lost)

5.
Number is odd: rightmost bit = 1
Number > 7: leftmost bit = 1