**Zenghao Gao** / ID: 260915701

1.

Given 8 random bits forming a byte, can you determine whether the byte represents an integer or a character? Why?

No, It’s up for the programs (usually compilers) to track it. In fact, the meaning of “bit patterns” is interpreted by whatever reads them.

2.

Load R0 52

Save R0 01

Load R0 53

Save R0 01

Load R0 54

Save R0 01

3.

102310 → 11111111112 → 17778

101101102 → 18210 → B616

4.

00110110+01111001=10101111 Signed Overflow! Because the number overflowed to the sign bit, therefore changing the sign of the number, even if the addition isn’t supposed to produce a negative number

10101111+11110100= 10100011 Bit Carry Overflow! To perform a subtraction we convert the second number to two’s complement number which is by taking the inverse and shifting up by one, then we add the two numbers up. Because the result is over the maximum of 8 bits, a bit carry overflow occurs and only the last 8 bits are saved into the output.

5.

