1. Null & Lobur, Chapter 4, #19.

2. Explain why a Java program can be seen both as being translated and also as being interpreted.

3. This question asks about a 2M x 32 memory module built using 256K x 8 RAM chips.
   a. For the following questions assume that the module is byte addressable.
      i. How many memory addresses does the module contain?
      ii. How many bits are needed to fully address the module?
      iii. How many RAM chips are in each row? How many rows of chips are there?
      iv. Draw a picture of the address divided into sections for the byte select, row select and chip address, indicate the number of bits in each section.
      v. In which row of chips would the data for address 0x4FB46A be found?
   b. Repeat parts i, ii, and iv from part a assuming that the module is word addressable with 16 bit words.

4. This question asks about a 4KB byte addressable memory constructed using sixteen 256 x 8 modules.
   a. How many bits are needed to fully address the memory?
   b. How many bits are needed for the module select?
   c. On which module and at what module address is data for memory address 0x4E4B found if:
      i. Low order interleaving is used.
      ii. High order interleaving is used.

5. Write an assembly language program that performs the same function as the following high-level language pseudo code.

```assembly
int x;
int y;
int z:

Read x;
Read y;
z = (x-100) + 2*(y + 50);
Print z;
```
6. Write an assembly language program that reads a number from STDIN and writes its complement (i.e. -1 times the number) to STDOUT without using the SUB opcode.

7. Write an assembly language program that reads two numbers from STDIN and writes their product (i.e. A * B) to STDOUT. You may assume that the numbers read in are both positive. NOTE: Our assembly language does not have a multiplication instruction!