# Chapter 1

1. What is everything inside the computer represented with?
2. Are there types at the machine level?
3. If you have B bits how many things can you represent?
4. If you have a system that has S unique states how many bits do you need to represent them all?
5. Are there types at the machine level?
6. Be able to convert a number from one base to any other base
   1. You can use the program you wrote in homework 1 to check and see if you did it right
7. Given a bit string be able to interpret as a
   1. Unsigned Number
   2. Signed Magnitude Number
   3. 2’s Complement Number
   4. Floating Point Number
      1. https://www.h-schmidt.net/FloatConverter/IEEE754.html
8. Given a number be able to find its representation as a
   1. Unsigned Number if positive
   2. Signed Magnitude Number
   3. 2’s Complement Number
   4. Floating Point Number
      1. https://www.h-schmidt.net/FloatConverter/IEEE754.html
9. What does it mean that memory is byte addressable?
10. What is a word?
11. What does it mean for a machine to be little endian? Big endian?
    1. On a 16 bit word machine what is the value of 0x4A3B if the machine is little endian? Big endian?
12. What are the two ways that multidimensional arrays can be allocated? How does C determine which to use?
13. Is C row major or column major?
14. Be able to write any array access without using brackets.

# Bitwise operators

1. Be able to use bitwise operators to
   1. Check if a bit is a 0 or 1
   2. Change a bit to a 0 or 1
   3. Extract a field

# Chapter 2

1. What are the two major components of your computer?
2. What are two reasons a program compiled on one computer might not run on another?
3. What is the purpose of each of the following hardware components
   1. CPU
   2. Memory
   3. I/O Devices
   4. Bus
      1. Data
      2. Address
      3. Control
4. What does it mean that RAM is volatile?
5. What are the 4 steps of the CPU Cycle?
6. What is the CPU speed equation?
7. What is going to be more important for most people CPU time or Wall time?
8. What do each of the following components inside the CPU do
   1. ALU
   2. PC
   3. Data Registers
   4. MAR
   5. MDR
   6. IR
   7. ESP
   8. Flags

# Debugging

Be able to write the gdb commands that do the following

* Set a breakpoint on a particular line of the current file
* Set a breakpoint on a particular line of a specific file
* Print/display out the value of a variable
* Print/display out the elements of an array
* Print the current local variables
* Go to the next line of code going into functions
* Go to the next line of code going over functions
* Continue execution until the next break point