

ME333 – Winter Break Homework – Yael Ben Shalom

Exercise 1:

C file Attached under Exercise1 folder.

Exercise 2:

A pointer variable is a variable that stores the address of another variable. For example, for `int *ip`, the type of `ip` is "pointer to type `int`".

Non-pointer variable is a variable that stores a value. For example, for `int ip`, the type of `ip` is an `int`. `ip` stores an `int`, and not an address.

Exercise 3:

The difference between interpreted and compiled code is that interpreted code is converted to machine code and executed while the program is running, while compiled code is converted to machine-code in advance. Compiled code typically runs faster than interpreted code, since the translation to machine code is done in advance.

Exercise 4:

the conversion of the hexadecimal numbers to binary numbers and decimal numbers:

hexadecimal	decimal	binary	most significant bit
0x1E	30	00011110	0
0x32	50	00110010	0
0xFE	254	11111110	1
0xC4	196	11000100	1

Exercise 6:

Every byte of memory → addressed by 16-bit address = 2 byte address → corresponding byte in memory.

My computer has 15.2 GiB = 15.2×10^9 bytes = $15.2 \times 10^9 \times 16$ bits = 2.432×10^{11} .

Exercise 7:

- `ch = 'K'` can be written equivalently using the number 75 on the right side.
- The number for `'5'` is 53.
- The number for `'='` is 61.
- The number for `'?'` is 63.

Exercise 8:

- a. The range of values for an unsigned char is $0 - 2^8 - 1$.
- b. The range of values for an short is $-2^{15} - 2^{15} - 1$.
- c. The range of values for an double is $-2^{2048} - 2^{2048} - 1$.

Exercise 10:

The different between sign and unsigned integers is that signed integers can get any value between $-2^{31} - 2^{31} - 1$, including negative values, and unsigned integers can only get positive integers between $0 - 2^{32} - 1$.

Exercise 11:

- a. For integer math, the pros and cons of using chars vs. ints are:
 - Ints can represent a larger range of numbers, but saves less memory than chars.
 - Chars saves memory, but works only for small numbers (lower range than ints).
- b. For floating point math, the pros and cons of using floats vs. doubles are:
 - Floats have faster computation and requires less memory, but have a poor resolution when compared with doubles.
 - Doubles requires more memory, but have a maximum resolution.
- c. For integer math, the pros and cons of using chars vs. floats are:
 - Chars saves memory, but works only for small numbers (lower range than ints).
 - Floats have slower computation of integer math and can't represent a larger range of integers, there are no pros to floats for integer math. It's better to use ints or chars.

Exercise 16:

The pointer type is "pointer to type double". The pointer is an address, so in our situation, the pointer occupy eight bytes.

Of the common integer and floating point data types discussed in the chapter, the most similar to the pointer type is an unsigned integer, because address has no decimal point (so it can't be similar to float), and no negative values (so it can't be similar to a signed integer).

Exercise 17:

The contents (hex) address ranges (unknown = -)

	i	j	kp	np
a	-	-	-	-
b	-	-	0xB0	-
c	-	-	0xB0	-
d	0xAE	-	0xB0	-
e	0xAE	-	0xB0	0xB0
f	0x12	-	0xB0	0xB0
g	0x12	0x12	0xB0	0xB0