CSSE 132 – Introduction to Systems Programming
Rose-Hulman Institute of Technology

Quiz 3 Memory Addressing

Name (Print):_____ RHIT Username:_____

1. Complete the conversions of large quantities below.

   1 **K** = [ ] ≈ [ ] 1 **M** = [ ] ≈ [ ] 1 **G** = [ ] ≈ [ ]

2. Convert 2^{34} Bytes to an appropriate large quantity (either **K**, **M** or **G**). *(Make sure to write down both the **quantity** and the **unit**)*

3. How is data stored in main memory?

   From a software perspective, main memory is organized as [ ], *where*

   1) each entry is exactly [ ];

   2) the indices (addresses) are represented by [ ].

4. What does it mean for a CPU to be L-bit, where L can be 8, 16, 32, or 64 in practice? Namely, what does the number L entail?

   L is [ ] *that the CPU supports.*

5. What is the minimum number of address bits a CPU needs to support N bytes of memory? (*Answer with a formula of N*)

6. What is the maximum memory space a 24-bit CPU (assuming it exists) can support?

7. Big Endian *v.s.* Little Endian

   - A **big-endian** system stores the [ ] at the lowest memory address.
   - A **little-endian** system stores the [ ] at the lowest memory address.

8. Given a **4-byte** number `0x12345678` in hexadecimal, store it into memory [*starting at address* **0x001**].

   (a) If the computer is using **Big Endian**

···					···
	0x001	0x002	0x003	0x004	

   (b) If the computer is using **Little Endian**

···					···
	0x004	0x003	0x002	0x001	

9. Given a **4-byte** integer stored in the memory [starting at address **0x010**], write down the number in *hexadecimal* if the computer is using...

···	0x10	0xff	0x00	0x00	0x00	0x00	···
···	0x00f	0x010	0x011	0x012	0x013	0x014	···

   (a) **Big Endian**

   (b) **Little Endian**

10. **Reflection:** What is one thing from this topic that you found interesting, OR what is one question you are now curious to learn more about?