CS 429 Quiz 3: March 24, 2018

Name/EID: ____________________________________________

Note that this quiz has two sides.

1. (6 points total) Consider the following declarations compiled for an x86-64 machine running Linux:

   struct node {
     char c[5];
     int i;
     short j;
     struct node *next;
   } my_node;

   (a) _____ How many bytes are allocated for each instance of my_node?

      A. 8  B. 18  C. 20  D. 24  E. 32  F. none of these

   (b) _____ How many bytes are in the smallest struct containing the same elements (but reordered) as my_node?

      A. 8  B. 18  C. 20  D. 24  E. 32  F. none of these

   (c) _____ Suppose my_node were a union instead of a struct. How many bytes would be allocated for each instance?

      A. 8  B. 18  C. 20  D. 24  E. 32  F. none of these

2. _____ (2 points) Suppose we invent a new technology that allows storing 3 states, not just 2. Instead of bits (0, 1), we have trits (-1, 0, +1). What’s the maximum number of integers we could represent in n trits?

      A. $2^n$  B. $3n$  C. $3!$ (3 factorial)  D. $3^n$  E. $2^{n+3}$

Page total: _____/8
3. _____ (2 points) Arguments passed to functions in x86-64 are passed via:
   A. main memory
   B. the stack
   C. registers
   D. a combination of stack and registers
   E. None of the above.

4. _____ (2 points) With respect to byte ordering, the x86 is
   A. little endian
   B. big endian
   C. has no “endianess”
   D. has “endianess” determined by the operating system

5. _____ (2 points) Assume that %rcx has value a and %rsi has value b. Under which of the following conditions is the branch to .L5 taken?
   
   subq %rsi,%rcx
   jg .L5

   A. a < b   B. a ≤ b   C. a > b   D. a ≥ b

6. _____ (2 points) On an x86-64 Linux system, which of these take up the most bytes in memory?
   A. char a[7]
   B. float d
   C. short b[3]
   D. int *c

7. _____ (2 points) What is the C equivalent of movq 0x10(%rax, %rcx, 4), %rdx?
   A. rdx = *(rax + rcx*4 + 0x10)
   B. rdx = *(rax + rcx + 4 + 0x10)
   C. rdx = rax + rcx + 4 + 10
   D. *(rax + rcx + 4 + 10) = rdx

Page total: _____/10