**Computer Science Department**

**California State University, Fullerton**

CPSC 240 Computer Organization and Assembly Language

Quiz 02

3:00 pm to 4:15 pm

Thursday, October 19, 2023

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**Note:**

* University regulations on academic honesty will be strictly enforced.
* You have 75 minutes to complete this Quiz.
* Open books, slides and sample programs.
* Turn off or turn vibration your cell phone.
* Use “yasm” assembler to assemble the source code.
* Use “ld” linker to link the object code
* Use “ddd” debugger to simulate the executable code.
* Each student can only submit solution once, and secondary submissions will not be graded. If you have submitting problems, please inform your instructor before you leave the classroom.
* Any content submitted after the due date will be regarded as a make-up quiz.

Quiz 02

1. Download the “CPSC-240-09 Quiz 02.docx” document.
2. Convert the following C/C++ variable declarations and arithmetic operations to x86-64 assembly language. Use the “yasm” assembler to assemble the program, the “ld” linker to link the object code, and the “ddd” debugger to simulate the executable code.   
   NOTE: variable sizes and program functions should be equivalent to C/C++ instructions.

signed char num[10] = {-12, 23, 34, 45, -56, 67, 78, -89, 90, 125}; //8-bit numeric array

signed char pOdd[10]; //8-bit non-initial array

register long rsi = 0 //64-bit register

register long rdi = 0 //64-bit register

register long rcx = 10 //64-bit register

do {

if(num[rsi] > 0 && num[rsi]%2 != 0) { //if positive odd number

pOdd[rdi] = num[rsi]; //copy to pOdd[rdi]

rdi++; //rdi = rdi + 1

}

rsi++; //rsi = rsi + 1

rcx--; //rcx = rcx - 1

} while(rcx != 0); //if rcx == 0 then finish

1. After assembling and linking, run the DDD debugger to display the simulation result values of num and pOdd in the memory.
2. Insert source code and the simulation results (GDB window) to the bottom of the document.
3. Save the file in pdf or docx format and submit the pdf or docx file to Canvas before the deadline.
4. Deadline is 4:15 pm on 10/19/2023.

[Attach your assembly source code here:]

A screenshot of a computer

Description automatically generated

[Attach GDB window with all memory data here:]

A number on a white background

Description automatically generated

A number on a white background

Description automatically generated