

CSCI 516 - Fundamental Concepts in Computing and Machine Organization

Programming Assignment 3

Due on: 11/17/2022, 11:55 PM

Requirement

- Compile and simulate the assembly program (.S file) using DS-5 simulator.
- Comment your assembly code.
- Name the source file according to the question number, like: 1.S; 2.S, 3.S, etc...
- Only upload the .S files to D2L, DO NOT upload the entire DS-5 project.

Questions

1. Write a ARMv8 program that finds voltage drop and power dissipated by a resistance (R) when a current (I) flows through it. Resistance and current values are given as inputs. Create a function that would find the voltage drop and create another function that would find the power. Use these functions in your program. The input and output values are single precision floating-point values. Assume the input resistance value (R) is in register S0 and current (I) is in register S1. Store the computed voltage drop in register S2 and computed power in register S3. Use single precision floating-point to compute voltage drop and power.

2. A snail fell in a 100 meter well and wants to go back up. Every day it goes back up half the distance that is left to go up. The total distance y the snail climbed back in n days is computed by the equation $y = \sum_{x=1}^n (100/2^x)$. The input n is in register X19 and is a non-zero integer less than 256. The output y should be stored in register S1. Use single precision floating-point to compute y .

3. Computation of exponential function is given as $e^x = \sum_{n=0}^a \frac{x^n}{n!}$. Write a LEGv8 assembly program to compute the exponential value. Assume the input x is in D0 and the input a is in X19. Store the result in D1. The user input x is a double precision floating-point value between -5.0 and 5.0 . The user input a is a 64-bit non-negative integer less than 16. Use double precision floating-point to compute e^x .