

UNIVERSITY OF CALIFORNIA, DAVIS

Department of Electrical and Computer Engineering

EEC 170
Winter 2021

Introduction to Computer Architecture

Project 1

Due: 11:59 pm Tuesday 2 February.

Write functions in RISC-V assembly for the following problems and simulate in RARS:

Refer [Getting started with RARS](#) for tips/suggestions.
You can find the recorded lab tutorial at [here](#).

Given a year find if it is a leap year or not

Your program should expect register x10 to hold the year (unsigned 32-bit integer). Your program should compute whether the year is a leap year or not. If it is a leap year store the value 1 in the x10 register. If the year is not a leap year store the value 0 in the x10 register. If the input is not a positive integer, your program should return the value -1 in register x10.

Calculating Greatest Common Divisor

Calculate the Greatest Common Divisor of two 32 bit unsigned integers. Your program should expect registers x10 and x11 to hold the first and second input respectively. Your program should compute the result and store it in register x10. If either of the two inputs is zero, your program should return the value -1 in register x10.

Finding the Nth prime number

Given an unsigned 32-bit number N, the task is to find the Nth prime number. Your program should expect register x10 to hold the number N. After finding the Nth prime number, return its value back in x10. If the input N is zero, your program should return the value -1 in register x10.

Finding palindrome number

Given an unsigned 32-bit number, write a function that returns 1 if the given number is a palindrome when expressed as a hexadecimal number, else 0 if it is not. For example, 12321 is a palindrome, but 1451 is not a palindrome. Your program should expect register x10 to hold the input number. If the number is a palindrome, store the value 1 in the x10 register, and if not store the value 0 in the x10 register. If the input is zero, your program should return the value -1 in register x10.

Project Submission format

Assembly files for each of the above problems should be named as below.

Problem 1 as lpyear.asm

Problem 2 as gcd.asm

Problem 3 as npnum.asm

Problem 4 as palin.asm

All four assembly files must be stored in a folder, compressed, and submitted through canvas.