UNIVERSITY OF CALIFORNIA, DAVIS
Department of Electrical and Computer Engineering

EEC 181A   **Winter 2025**

LAB 3: Running the Linux system on a DE1-SoC Board

I. Introduction

In this lab, you will learn how Linux can be stored onto a microSD memory that can be inserted into the DE1-SoC board and booted by the ARM processor. You will also see how software programs can be developed that run on the ARM processor under Linux.

II. Install and Run Linux System on the DE1-SoC board

Linux is an operating system (OS) that is found in a wide variety of computing products such as personal computers, servers, and mobile devices. Standard distributions of Linux include device drivers for a vast array of hardware devices. In this tutorial, we make use of some existing drivers, and also show how the user can make drivers for their own hardware.

1. Download the Linux SD card image file to your PC
   https://fpgacademy.org/tutorials.html

2. Follow the instructions from Chapter 2.3 - 2.7.5 to set up the Linux system
   https://ftp.intel.com/Public/Pub/fpgaup/pub/Teaching_Materials/current/Tutorials/Linux_On_DE
   _Series_Boards.pdf
   2.3. Preparing the Linux* MicroSD* Card
   2.4 Setting up your DE-series Board for use with Linux
   2.5 Connecting your DE-series Board to a Host Computer
   2.6 Connecting to the Host Computer using a USB Cable
   2.7 Connecting to the Host Computer using a Network

3. Follow Chapter 3.1 on the previous tutorial to write a Helloworld program

4. Get familiar with the Linux command line
   https://www.youtube.com/watch?v=y6hIs8AEgNc

III. Matrix Multiplication in C

1. Save the 4x4 * 4x4 matrix data in two .txt files

2. Write a C program to compute the matrix multiplication result and save the output file to a txt file

3. Verify the result with Matlab code from lab2

4. Use the #include <time.h> library to calculate the execution time and compare the execution time with the execution time on the FPGA side in lab2