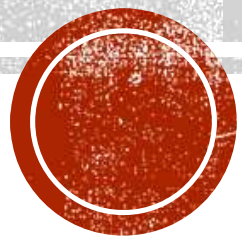
EMBEDDED SYSTEMS CMPE-453

Department of Computer Engineering



Introduction

INSTRUCTOR AND TAs

- Instructor
  - Office Hours: Wednesday:16-17, Friday: 15-16
  - Contact: yucel.cimtay@tedu.edu.tr
  - Room: A425

- TAs
  - Deniz Merve Gunduz, dmerve.gunduz@tedu.edu.tr
  - Semihanur Aktay, semihanur.aktay@tedu.edu.tr
  - Room: B343, A420

COURSE OBJECTIVES

- Understanding the architecture of AVR and ARM7 microcontrollers
- Programming AVR and ARM7 microcontrollers using C
- Building AVR and ARM7 based applications using peripherals.

EXPECTED SKILLS

- Understanding of computer organization – CMPE 361
- Familiarity with any programming language

ASSESSMENT

Assessment	Midterm	Final	Labs	Quizzes	Total
Points	18	30	32	20	100

- Quizzes:
  - 2 quizzes
  - No makeup
- Labs:
  - 8 labs
  - No makeup

HOW LABS WILL BE CONDUCTED?

- Lab implementation using Arduino Uno board
- Circuit components
- Arduino IDE
- Keil uVision
- Proteus
- PC/Laptop

WHAT IS A MICROCONTROLLER

- Chunk of silicones (40 million transistors)

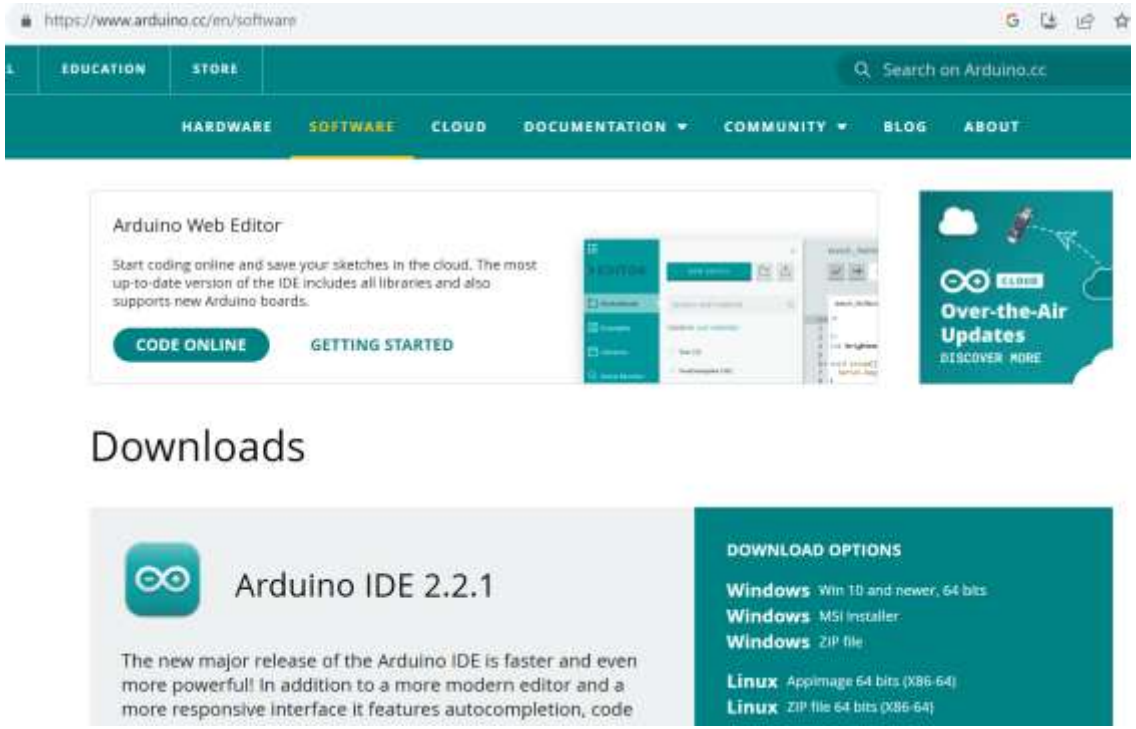
- First transistor: in 1947 by William Shockley, John Bardeen and Walter Brattain
- A complete but scaled down computer on a single chip
- Used in embedded systems to perform specific tasks

WHAT YOU WILL LEARN?

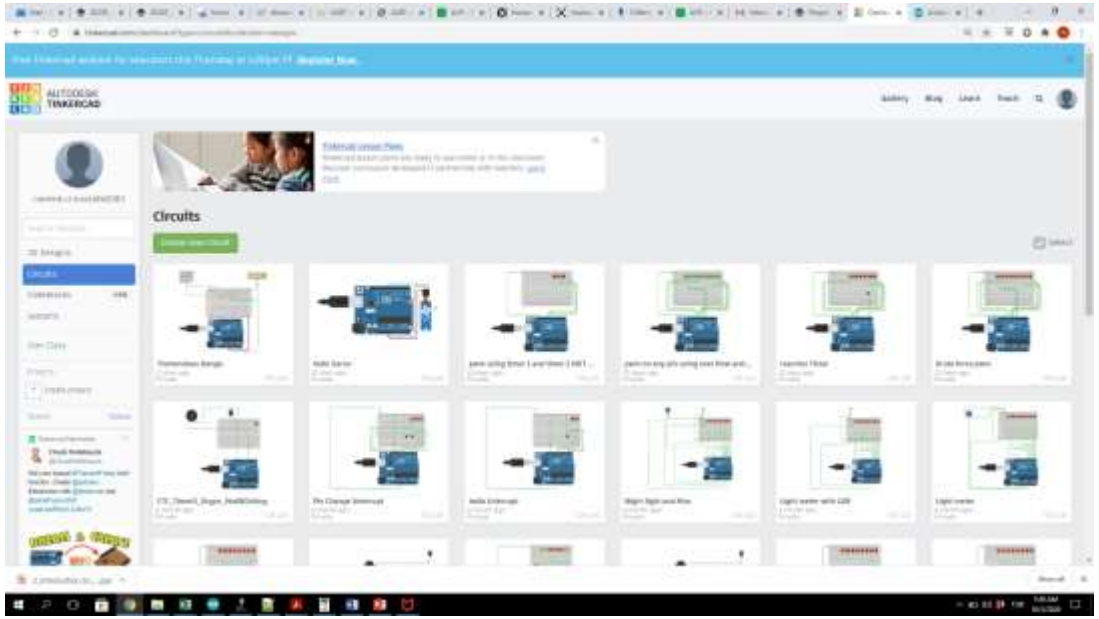
- Architecture of AVR microcontroller
- C programming
- I/O port programming
- Serial Communication: USART, SPI, I2C
- Analog-to-Digital Conversion (ADC)
- Interrupts
- Timers/counters
- PWM
- Architecture of ARM7 Microcontroller
- Coding ARM7 by using C

SOFTWARES

- Arduino IDE

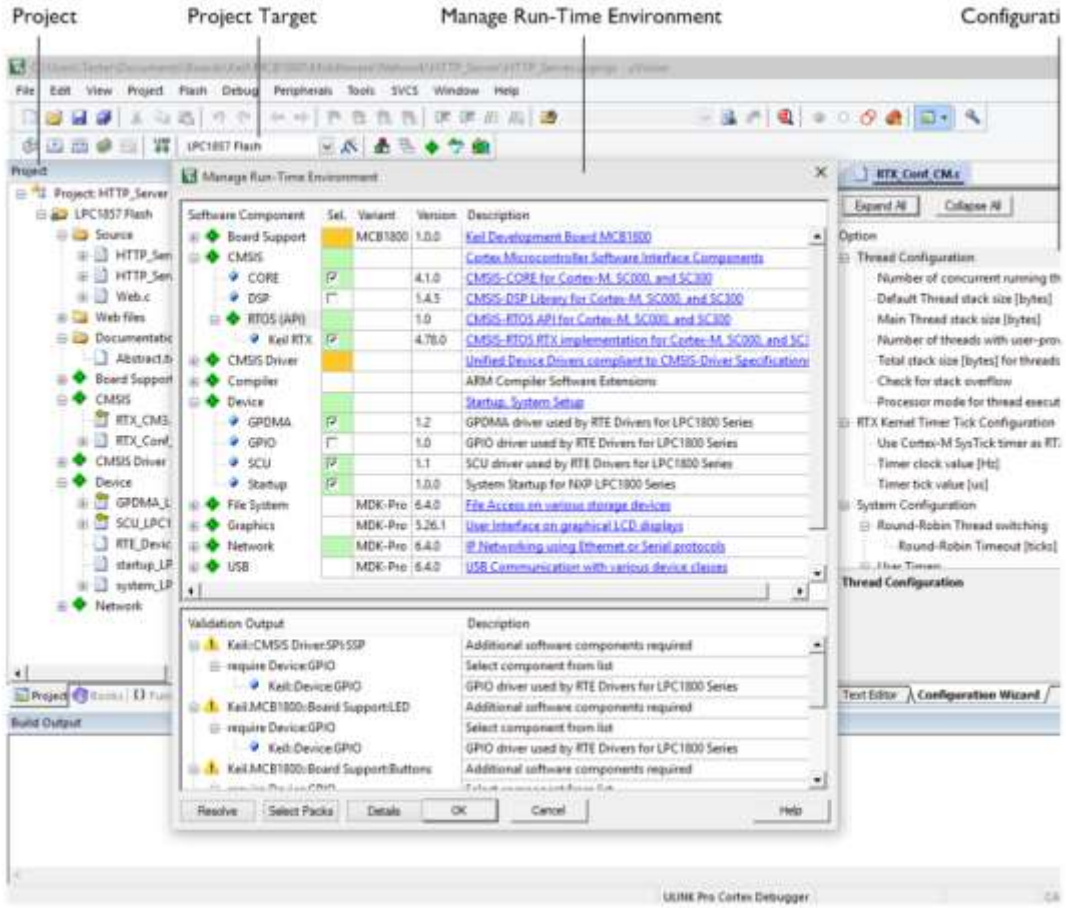


Tinkercad: https://www.tinkercad.com (simulation)

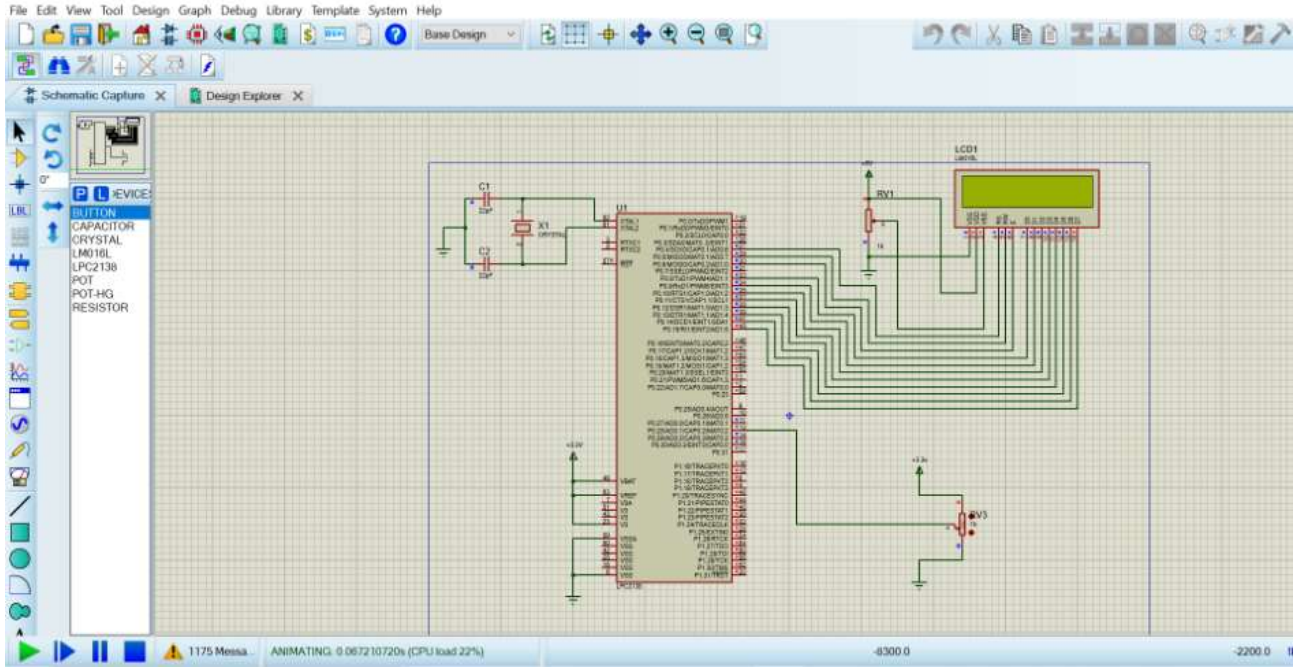


SOFTWARES

Keil µVision



Proteus



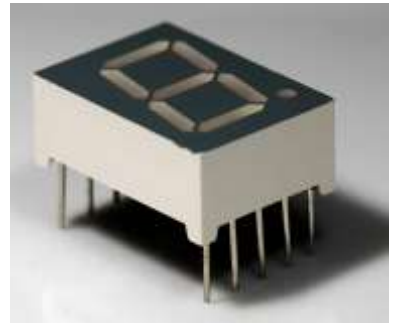
COMPONENTS NEEDED FOR LABS

- Arduino Uno

- 10 LEDs

- LDRs

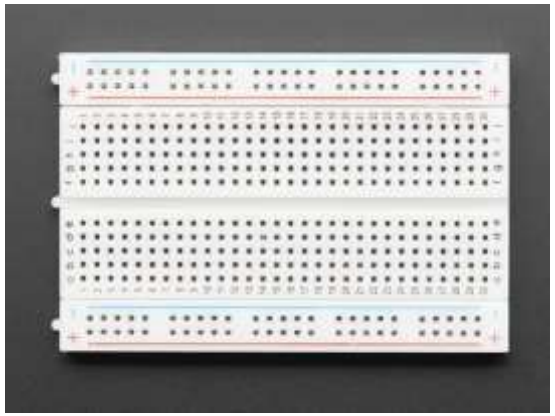
- 7-segment display



- touch sensor

- USB Cable Type A-B

- Bread board



- push buttons