EE186 Homework 3

Due: October 20, 2026

1. A timer is clocked at 16 MHz and must generate a PWM signal at 1 kHz with a 60% duty cycle. The timer operates in PWM mode 1 (output is high while the counter is less than the content of CCR). How would you design the prescaler (PSC), the auto-reload register (ARR), and the compare and capture (CCR)? Show your calculation.

2. You are designing a sensor network with four temperature sensors and one microcontroller. Each sensor needs to send data every 10 ms. Compare UART, SPI, and I^2C in terms of required pins, wiring complexity, and feasibility.

3. Why are I^2C lines (SCL and SDA) implemented as open-drain on STM32L4 microcontrollers instead of push-pull outputs? What potential issue would occur if push-pull were used?