Week 2 Homework

1. (2 Points) In your own words, what are the differences between a microcontroller and a microprocessor? Are there times where you could use either one to design a system?
2. (2 Points) There were several questions mentioned at the beginning of the lecture that should be asked when designing an embedded system. For each question, explain a scenario where a microprocessor makes the most sense and then explain a scenario where a microcontroller makes the most sense.
    a. What processing power is required?
    b. What interfaces are required?
    c. How much storage and memory is required?
    d. How much power is available?
    e. Is the products footprint a concern (form/fit requirements)?
    f. Is the system geared towards a specific task? Or multiple tasks?
    g. What environment will the system operate under?
3. (2 Points) An automobile with today's technology is made up of many embedded systems. Think of each system in an automobile and identify whether a microcontroller or a microprocessor makes more sense. Pick 5 systems, at least one that would utilize a microprocessor and one that would utilize a microcontroller, and explain what you chose and why. Think of the criteria for a microprocessor and microcontroller and list the topics discussed in the lecture. Note that for some of these either choice may be correct and the answer relies on the explanation provided.
    a. The only required system to be chosen is Autonomous Driving capability (not listed below)

4. (2 Points) Suppose you are the designer of a large embedded system (lets say each system must perform 5-10 distinct tasks). Does it make more sense to use a single microprocessor or many microcontrollers and why? What assumptions did you make in this decision?
5. (2 Points) After reviewing the STM32 IoT board, think of an embedded system that you would like to create based off of the components contained on the board and the supported features. Describe your system and how the STM32 IoT board meets your systems requirements.