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Lab Section: 9

CprE 288 Spring 2021 – Homework 1

Submit to Canvas by midnight on the due date given in Canvas.

Instructions:
1) Select one question from Homework Question Set 1 posted in Canvas on the Homework page.
   a. Include the question number in your homework document, answer the question, and show your work.
   b. Note that solutions to the question set are also provided in Canvas on the Homework page. You are encouraged to try answering the question on your own before reading the solution. If your answer is incorrect, show how you corrected it.
2) List a key concept related to the question you chose, such as from the concept lists given in class or another concept you've identified in course resources. Briefly explain the concept and how it appears in the context of the question.
3) List one resource that has provided useful information about the concept (e.g., what the concept is about, what it looks like, how it works, why it's important, how it's used/applied, etc.). Resources may include, but are not limited to, textbooks/books used in the course, lecture slides, articles cited in the course or found on your own, lab manuals, datasheets, and other technical documentation. Be specific, for example, the name of the section or figure in a book.
4) Create a similar question – your own question with your own ideas and/or data. Write the question and answer it. You should double-check your answer for correctness.

Suggestion: Lab partners may want to coordinate, so that each of you selects a different question, and you can learn more from each other.

You should work all homework questions to support your learning, check your answers using the solutions, and get help and feedback when needed (instructor and TA office hours, collaborators (e.g., partners or other study groups), Piazza (preferred over email), class time). Students are encouraged to use the "5 Whys" approach when reviewing any question answered incorrectly (see Homework page in Canvas). Work on identifying gaps in knowledge and understanding.

Grading:
• This homework assignment will be graded as follows:
   o 40 points possible
   o 10 points each for items 1) – 4)
   o Since you are given the solution for the question you select, and since there is more than one correct answer for other items, your responses will be graded on a scale of 0 to 10 based on completeness, relevance and clarity.

Rules:
• Homework should be typed and submitted as a PDF or Word document (.doc or .docx) only. Sketches and diagrams may be hand-drawn if legible and neat.
• If collaborating with others, you must document who you collaborate with, and specify in what way you collaborated (see section below). Review the homework policy section of the syllabus. • Review University policy relating to academic conduct and integrity. See ("Academic Dishonesty"): http://catalog.iastate.edu/academic_conduct/#academicdishonestytext

Name: **Lab Section:**

Note: Unless specified otherwise, all problems assume the TM4C123 is being

used. Include your name and lab section on your submitted work.

Collaboration Documentation

List the people (first and last names) you collaborated with:

For each collaborator, briefly describe the manner in which you

collaborated: **YOUR WORK**

Question 2

2. a. What is the maximum clock speed of the CPU of TM4C123G?

   80 MHz

b. How many package pins does the TM4C123G micro controller have?

   64

c. What are the types and sizes of memory available, and the use for each memory type

   1. Flash — 256 KB / used for coding
   2. SRAM — 32 KB / used for data (Body)
   3. EE pRam — 2 KB / used for data storage
   4. ROM — Varies / Storing software and fixed Constant data

d. What does it mean for a General Purpose I/O (GPIO) pushpin to have an alternative function? Give one example of a GPIO pushpin and its alternate function

   An alternate function allows each shared pin to have multiple purposes and can act as a normal parallel port or as a serial port

   for example SSI0CLK ⟶ PA2 on pin 19

The text book describes two programming models presented in the textbook, Direct Register Access (DRA) and Software Driver (SD). This will analyze the Direct Register Access programming model. Briefly describe each of these models. Note these are not covered in the assigned readings, so you will need to search a little further.

DRA = This model uses code that writes values directly to a register. This is the quickest way to execute code but also is much harder to code for. It also reads values from a register by specifying the address of a register.

SD = This model uses code that isn't directly accessed by the register. This also is extremely easy to use for but does limit the user by giving them less control.