COMP261 - Spring 2002

Final Exam

Instructions:

1. Allow yourself two (2) hours to write this exam.

2. This exam will be released by 5pm on Monday, April 29, 2002. The completed exam is due by 3:30pm on Tuesday, April 30, 2002. You may choose any 2-hour time-slot between these hours to write the exam. For your convenience, the regular lab hours of 11am-1pm on Tuesday, April 30, 2002 have been canceled.

3. There are nine (9) questions in this exam.

4. This exam is worth 100 points. The points allocated for each question are noted in parentheses next to it.

5. To assist you in determining the appropriate length of your responses, suggested lengths are noted in brackets. Note that these lengths are mere suggestions, not rigid constraints.

6. This exam is open-book and open-notes. You are also free to access the course websites to download and look at any of the online documents. Once the exam is released, you may *not* discuss any aspects of the course project with anyone, until everyone has turned in their completed exams.

Exam Questions

1. Give an overview of the entire navigation system, accounting for all of the major function blocks. *(15 pts) [1 page]*

2. Hardware partitioning:
    a. Which components go where and why? *(5 pts) [1 para]*
    b. Specifically, discuss the issues involved in deciding which components belong in the hat unit and which belong in the belt-pack. *(10 pts) [1/2 page]*

3. How can a chip produce +12[V] and –12[V] RS232 level outputs, while only requiring 0[V] and 5[V] input voltage levels? *(5 pts) [1 para]*

4. Describe possible ways of representing orientation as a continuous function. *(10 pts) [1/2 page]*

5. There are multiple ways of dealing with switch bounce. Describe one. *(10 pts) [1 para]*

6. What were the motivating factors for our decision to switch to an 80C51-style microcontroller from a PIC microcontroller? *(10 pts) [1 para]*

7. Discuss the merits and liabilities of making the UART registers accessible to the application host. *(10 pts) [1 para]*

8. Compare the advantages and disadvantages of polling-based vs. interrupt-driven approaches to programming the MCU. *(10 pts) [1/2 page]*

9. Write pseudo-code for the MCU to implement a simple ranging function. *(15 pts)*