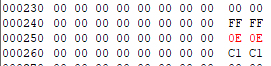
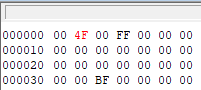
**Task1: Component Identification:**Identify the components (the peripheral modules on the HCS12 microcontroller) that you need to solve this problem. Please be as specific as possible; e.g., if you need 8 pins of PORT B, mention it here along with their directions. Also, briefly explain what they are used for, e.g., PTJ enables or disables eight flashing LEDs. Also, show any data declaration and initialization that you need for the initialization of your system.

**Task2:** Draw a flowchart of the main program and subroutine program. The flowchart demonstrates your program logic flow. If you need some help drawing a flowchart, an example is in Fig. 1 in the previous lab5 handout.

**Task3**: To analyze and validate your code using the CodeWarrior simulator, check the memory locations $0001 (PORT B) and $0258(PORT P) in the memory pane. For each inner loop iteration, write down the values in the memory locations (at $0001 and $0258) in Table 1 and generate the memory screenshots. The sample screenshots of the memory map are provided in Figure 2.

**Table 1. Memory map**

|  |  |  |
| --- | --- | --- |
| **Iteration** | **Memory $0001 (PORT B)** | **Memory $0258 (PORT P)** |
| **1** | **4F** | **0E** |
| **2** | **66** | **0D** |
| **3** | **6D** | **0B** |
| **4** | **7D** | **07** |



**Figure2. Screen shots of the Memory map**

**Task4:** Change the data in the data section to display the number **7890 on the four seven-segment LED**s in the Dragon 12 + board. Repeat step 7 and check the memory locations $0001 (PORT B) and $0258(PORT P). For each inner loop iteration, write down the values in the memory locations (at $0001 and $0258) in Table 2 and generate the screenshots of the memory.

**Table 2. Memory map**

|  |  |  |
| --- | --- | --- |
| **Iteration** | **Memory $0001 (PORT B)** | **Memory $0258 (PORT P)** |
| **1** |  |  |
| **2** |  |  |
| **3** |  |  |
| **4** |  |  |