Laboratory 2

Programming in C with CodeWarrior

Due Date: Beginning of Week 4 Lab Period

Files Needed:
Week2Lab.zip from Blackboard

Concept:

This lab introduces programming in C with CodeWarrior.

Assignment:

Open the project Week2Lab.mcp. Under the "Sources" folder in the file tree, there are three files. The file datapage.c is automatically generated by CodeWarrior when a C or C++ project is created, and for the purposes of our lab, we can ignore it (but not delete it).

One is subs.c, which is where your C code implementing the subroutine described below will be added. Note that the file includes "subs.h", which you can also see in the file tree under "Includes". If you open the "subs.h" file, it declares the subroutine priority and include "derivative.h". This file in turn includes "mc9s12dg256.h". Among other things, this last include file contains the typedefs for byte and word and needs to be referenced for the subs.c file to be able to use the S12-style data types. The file main.c file performs exactly the same function as the main.asm program did in the previous lab. The main program calls the priority subroutine with 8 different inputs.

The subroutine will examine a list of 64 bits. The bits are grouped into bytes and uniquely numbered. The first byte has bit 0 (low or rightmost bit) to bit 7 (high or leftmost bit), the second byte has bit 8 (low or rightmost bit) to bit 15 (high or leftmost bit), and so on. The subroutine should return the number of the lowest bit which is set to 1.

Your subroutine must meet the following requirements:

1. The subroutine must accept one input, a pointer to a byte, and this byte is the first byte in the 8-byte list.
2. The subroutine returns a byte, and this is the number of the lowest bit in the array that is set.

The subroutine must be written in C, and you should attempt (for a reasonable amount of time, not hours) to minimize the size in bytes of resulting code.

Deliverables:

- Your CodeWarrior project in a zip file.
- Running time of your subroutine in clock cycles for each of the 8 tables. This should be included in a text file attached to your project.
- A comparison between the running times and code size of your C implementation versus your assembly code from the previous lab. Discuss pros and cons regarding the process and the results of coding in each method.