Homework Assignment #2

Due 2/20/2015 @ 5PM

Instructions

You will turn in a single .zip file named hw2_firstname_lastname.zip that contains the following information to the drop box located on the ECE353 homepage:

Key Points

- All code should have comments. A 5 point penalty will be levied against each problem that is not commented sufficiently.
- All parameters should be verified for validity
- Any code that does not assemble/compile will receive no points.

1. **(50 points) Insertion Sort**
   Write an **EABI compliant** ARM assembly subroutine that implements the Insertion Sort sorting algorithm on an array of 32-bit unsigned numbers. The function is required to be named **`insertion_sort`** and conform to the following C function prototype.

```
void insertion_sort(     uint32_t *array,
                         int16_t size
                   );
```

   You must validate each of the parameters. The array address must be in the range of 0x20000000 to 0x20007FFC. The size must be in the range of 0 to 1024. If any of the parameters are invalid, return -1. If the parameters are valid, return 0.

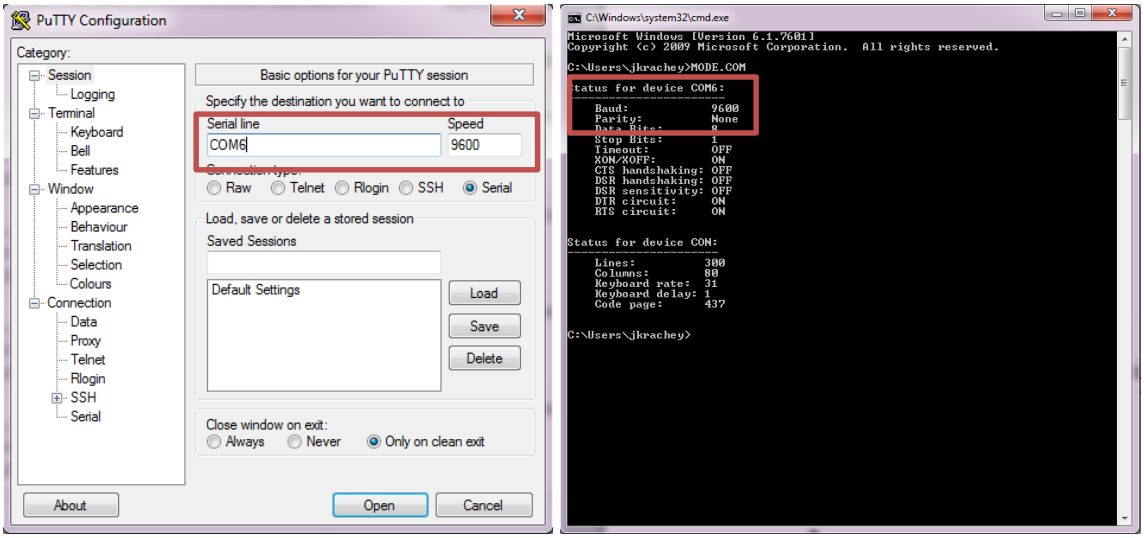
   The test bench includes a version of bubble sort that is used to confirm the results of your sort. The test bench measures the number of clock cycles required to complete both the bubble sort and insertion sort. Your implementation of insertion sort must reduce the number of clock cycles by at least 25% to receive full credit.

   The test bench can be found in `main.c`. You can use the test bench to help validate your implementation. The test is **not** exhaustive, so you may want to modify the test bench to verify your search function. When debugging, you can adjust the size of the array and the number of times the sort algorithm is run by adjusting the following #defines in main.c

```
#define ARRAY_SIZE   128
#define LOOP_COUNT   10
```

   Fill out your name in main.c for the PERSON1[] variable.

To view the results of the test bench, you can open up putty and configure it as follows:



Note that the COM Port will change depending on how your PC enumerates the Launchpad. You can use the device manager to list your COM Port. If you are not the administrator of the computer you are using, you can find the information from the Command Prompt and issuing MODE.COM.