Due Date: Thursday, March 16, 2011

Name: ........................................
1. (20 points)

Translate the executable part of the C function Question1 (shown in bold) into Pep/8 assembly code. Note that variable temp is local. State clearly any assumptions you make.

```c
int Question1(int counter)
{
    int temp;

    temp = counter * 2;
    if ( temp > 20) temp = 20;
    if ( temp > 5 && temp < 15 )
        return 1;
    else return 0;
}
```
2. (20 points)

We need a program that reads a sequence of characters (terminated by an exclamation point) and copies it to the output replacing any sequence of two or more consecutive space characters between words by a single space. Thus

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>The brown dog barks!</td>
<td>The brown dog barks</td>
</tr>
<tr>
<td>The blue frog croaks!</td>
<td>The blue frog croaks</td>
</tr>
</tbody>
</table>

(a) (7 points) Write an appropriate program in C or pseudocode

(b) (13 points) Translate your answer to (a) into Pep/8
3. (20 points)

Write a C function that is equivalent to the following Pep/8 subroutine

```
Q3:  subsp 2,i
    lda 4,s
    sta 0,s
    ldx 6,s
    breq done
    brlt loop2
loop1: lda 0,s
    asra
    sta 0,s
    subx 1,i
    brne loop1
    br done
loop2: lda 0,s
    asla
    sta 0,s
    addx 1,i
    brne loop2
done: lda 0,s
    sta 8,s
    ret2
```
4. (20 points)

Translate the following C function into a Pep/8 subroutine

```c
int BitCount (int M) {
    int counter = 0;
    while (M>0) {
        if (M%2 == 1) counter++;
        M = M/2;
    }
    return counter;
}
```
A student was asked to write a program that inputs a numeric score and outputs a letter grade. If the score is greater than 90 the output should be A, otherwise if the score is greater than 80 the output should be B. All other scores result in C. The students program is below. Write a shorter version.

deci number,d  
lda number,d  
cpa 90,i  
brgt Aout  
brle Btest  
Btest:lda number,d  
cpa 80,i  
bgt Bout  
brle Ctest  
Ctest:lda number,d  
cpa 60,i  
brgt Cout  
brle Cout  
Aout: charo ‘A’,i  
br end  
Bout: charo ‘B’,i  
br end  
Cout: charo ‘C’,i  
br end  
end: stop  
number:.block 2  
.end