EE 4341 Homework 2

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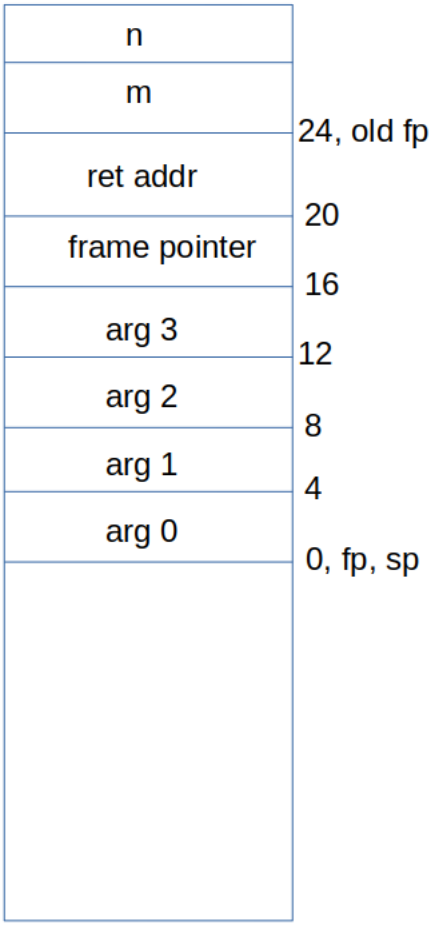
Problem 1.

(a) It is reentrant. There are no global or static variables used that could be modified elsewhere during an interrupt, and the function state can't be changed outside of itself.



(b)

(c) Each function frame needs 24 bytes on that stack, and the function will be recursively called three times, meaning that the stack needs 72 bytes to compute the GCD. The

value returned will be 6.

Problem 2.

(a)
```
void __ISR(_TIMER_1_VECTOR,IPL4SOFT) Timer1ISR(void) {
    if (counter == 0) {
        ISRdevice0();
    }
    else if (counter == 1) {
        ISRdevice1();
    }
    else if (counter == 2) {
        ISRdevice2();
    }
    counter = (++counter) % 3;
}
```

(b)
```
T1CON = 0x0;
TMR1 = 0x0;
PR1 = 0xFFFF;

IPC1SET = 0x0001;

T1CONbits.ON = 1;
```

Problem 3.

(a)
```
uint16_t Buffer[64];
uint16_t *Front = &Buffer[0];
uint16_t *Back = &Buffer[0];
```

(b)
```
void put(uint16_t val) {
    *Front = val;
    Front = (Front + 1) % 64;
}

uint16_t get(void) {
    uint16_t ret = *Back;
    Back = (Back + 1) % 64;
    return ret;
}
```

(c)
```
uint16_t Empty = 64;
uint16_t Full = 0;
```

(d)
```
//thread 1
```

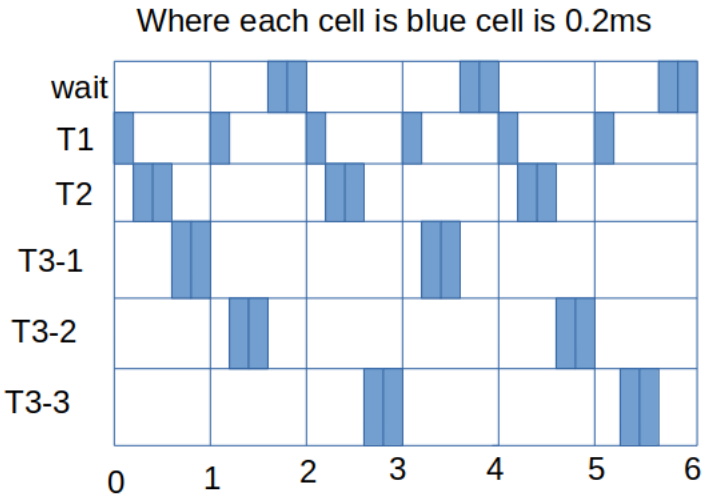
```
wait(&Empty)
put(data_value);
signal(&Full);

//thread 2
wait(&Full)
data_value = get();
signal(&Empty);
```

Problem 4.

(a) 0.8

(b) The minimum time slice would assume that all tasks run in every timme slice, so it would be 1.8ms

(c) Task 3 will need to be partitioned. The subtasks of this must have execution times of less than or equal to 0.4ms, as task 1 and 2 must run each time slice, leaving 0.4ms left in each time slice (maximum) for execution.



(d)

(e) Worst case latency is 0.4ms