EE319K Lecture Lec02.pptx in class worksheet (Quiz2 study)
Question 1. How many bits wide is Port B? How many bits wide is Port F?

Question 2. What are the required steps required to initialize a parallel port?

Question 3. What are the steps required to input one bit from an input pin?

Question 4. Why are there two shift right instructions (**`LSR`** and **`ASR`**)?

Question 5. Assume there are two 32-bit variables in RAM memory called In and Out. Write C code that sets **`Out`** equal to **`In`** plus 1.

Question 6. Assume there are two 32-bit variables in RAM memory called In and Out. Write assembly code that sets **`Out`** equal to **`In`** plus 1.

Question 7. List three example uses of the stack.

Question 8. What are the three stack rules?

Question 9. List three addressing modes.

Question 10. Why are there five versions of the LDR instruction?
LDR, LDRB, LDRSB, LDRH, LDRSH

Answer 1. Port B is 8 bits wide. Port F is 5 bits wide. We cannot use Port C bits 3,2,1,0 because these pins implement the JTAG debugger.

Answer 2. What are the 5 steps required to initialize a parallel port

Clock E.g., to enable Port E set bit 4 in SYSCTL_RCGCGPIO_R
Wait two bus cycles
Direction register (0 for input, 1 for output); E.g., Port E is **GPIO_PORTD_DIR_R**
Set bits in DEN register; E.g., Port E is **GPIO_PORTD_DEN_R**

These steps are optional

Clear AFSEL bits (optional, because reset clears them))
Clear AMSEL bits (optional, because reset clears them)
Clear PCTL bits (optional, because reset clears them)

Answer 3. To input one bit from an input pin we

First read the entire port into a register
AND or mask the particular bit we want

Answer 4. **`LSR`** is an unsigned shift right, bringing zeros into the most significant bit. **`ASR`** is a signed shift right, maintaining the sign bit as it shifts

Answer 5. **`Out = In+1;`**

Answer 6. Write assembly code that sets **`Out`** equal to **`In`** plus 1.

```
LDR R0,=In  ;R0 points to In
LDR R1,[R0] ;R1 has value of In
ADD R1,R1,#1
LDR R2,=Out ;R2 points to Out
STR R1,[R2] ;set the value of Out
```

Answer 7. List three example uses of the stack.

Temporary storage
Parameters passing
Local variables
Save context during an interrupt

Answer 8. What are the three stack rules?

1. Program segments should have an equal number of pushes and pops
2. Stack accesses (push or pop) should not be performed outside the allocated area
3. Stack reads and writes should not be performed within the *free area*

Answer 9. Three addressing modes are immediate, indexed, PC-relative

Answer 10. The load instruction needs to know the size and signed/unsigned type

LDR loads 32-bit signed or unsigned value from memory
LDRH loads 16-bit unsigned value from memory
LDRSH loads 16-bit signed value from memory

LDRB loads 8-bit unsigned value from memory
LDRSB loads 8-bit signed value from memory