



4. (15 points) Suppose the stack pointer is initialized to `RAMEND - 0x20`. Explain with a picture and words what changes to the stack and stack pointer will result from executing the following instructions.

start:

```
clr    r16
push  r16
rcall later
```

later:

```
push  r16
pop   r16
ret
```

5. (20 points) Write a subroutine, `initADC3`, that configures the ADC subsystem such that:
- uses ADC channel 3 for input,
  - places the 8 most significant bits in the same output register,
  - uses a input voltage range of 0 to 5 volts,
  - uses the slowest possible clock speed, and
  - assumes polling (not the interrupt subsystem) will be used.



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6. (15 points) Write a `delay2ms` subroutine that uses the `Timer/Counter0` subsystem to delay for 2 ms before returning.

7. (20 points) Write a complete program that configures the Timer/Counter0 subsystem to interrupt every  $X$  seconds where  $X$  is the largest possible delay. Whenever an interrupt occurs, a 16-bit value stored in SRAM (initialized to zero when the program starts) should be incremented. Once everything has been initialized properly, the main program should sit in a tight loop doing nothing.



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Additional work area for any problem. Clearly identify to which problem the work on this page is related.