Chapter 9: Input/Output

I/O allows interaction between humans and computers via I/O devices.

- There are two I/O models:
  - Special I/O instructions to direct the CPU
  - Memory mapped I/O - Reserves address space to access I/O devices like memory
- In memory mapped I/O:
  - Control register signals data is ready
  - Data register contains data from I/O device
- **Polling** continuously checks the control register until data is ready
- For infrequent I/O, **interrupts and exceptions** are better than polling
  - *Interrupts* are asynchronous external events that can be handled when convenient
  - *Exceptions* are synchronous events that interrupt execution immediately
- Servicing interrupts/exceptions via new code is called **trapping**
- Trap handlers save incomplete pipeline instructions and CPU state
  - Once handled, state is restored and execution resumes where it left off
- Exceptions provide immediate handling of urgent external events