

Interface

- Wikipedia definition - a shared boundary across which 2 or more separate components of a computing system exchange information
- Defined separately from the implementation (in the design phase)
- It is not necessary to know the implementation details to use the interface (abstraction!)

Instruction Set Architecture (ISA) Level

- Interface between software and hardware
- Compilers target the ISA level and do not need to worry about the microarchitecture

Backwards compatibility

- Allow old compiled programs to run in a new ISA

Characteristics of an ISA

- Registers
- Instructions
- Data types
- Memory model

Execution Modes

- Kernel mode
 - Enabled for the operating system
 - Allows all instructions
- User mode
 - Enabled for applications
 - Does not allow certain instructions

Memory Models

- Memory is divided into cells, each of which has an address
- Modern computers have 8-bit cells (bytes)
- Words
 - ISA usually has instructions for operating on words instead of bytes
 - Alignment
 - Machines often fetch words from memory
 - With an 8-byte (64 bit) word size, addresses that are multiples of 8 are aligned to the words
 - A value that occupies a word should be aligned so it can be fetched efficiently