LECTURE 6, 7

CISC Vs. RISC

Topics to be covered

- Difference between RISC and CISC

Complex Instruction Set Computer (CISC)

- Memory in those days was expensive
- bigger program->more storage->more money
- Hence needed to ***reduce the number of instructions per program***
- Number of instructions are reduced by having ***multiple operations*** within a single instruction
- Multiple operations lead to many different kinds of instructions that access memory
- In turn making instruction length variable and fetchdecode-execute time unpredictable – making it more complex
- Thus hardware handles the complexity
- Example: x86 ISA

Examples of CISC processors are the

– System/360(excluding the 'scientific' Model 44),

– VAX,

– PDP-11,

– Motorola 68000 family

RISC

- Original idea to reduce the ISA(inst. Set archit)
- Provide ***minimal set of instructions that could carry out all essential*** operations
- Instruction complexity is reduced by
- 1. Having ***few simple instructions*** *that are the same length*
- 2. Allowed memory access only ***with explicit load and store instructions***
- Hence each instruction performs less work but instruction execution time among different instructions is consistent
- The complexity that is removed from ISA is moved into the domain of the assembly programmer/compiler
- Examples: LC3, MIPS, PowerPC (IBM), SPARC (Sun)

Apple iPods (custom ARM7TDMI SoC)

- Apple iPhone (Samsung ARM1176JZF)
- Palm and PocketPC PDAs and smartphones (Intel XScale family, Samsung SC32442 - ARM9)
- Nintendo Game Boy Advance (ARM7)
- Nintendo DS (ARM7, ARM9)
- Sony Network Walkman (Sony in-house ARM based chip)
- Some Nokia and Sony Ericsson mobile phones

CISC OR RISC

CISC

- Complex Instruct Set Computers.
- There are a large no. of instructions, each carrying out a different permutation of the same operation with instructions perceived to be useful by the processor's designer
- A conditional jump is usually based on status register bit.
- 8051

RISC

- Reduced Instruct Set Computers.
- The instructions are at as bare a minimum as possible to allow the user to design their own operations.
- It allows the use of simple instructions to be used for different operations.
- They have orthogonal Register set.
- A conditional jump can be based on a bit anywhere in memory
- PIC