**Chapter 13 - Exercises**

**13.1 Briefly define immediate addressing**.

Immediate addressing: The value of the operand is in the instruction.

**13.2 Briefly define direct addressing.**

Direct addressing: The address field contents the effective address of the operand

**13.3 Briefly define indirect addressing.**

Indirect addressing: The address field refers to the address of a word in memory,

which in turn contains the effective address of the operand.

**13.4 Briefly define register addressing.**

Register addressing: The address field refers to a register that contains the

operand.

**13.5 Briefly define register indirect addressing**.

Register indirect addressing: The address field refers to a register, which in turn

contains the effective address of the operand.

**13.6 Briefly define displacement addressing.**

Displacement addressing: The instruction has two address fields, at least one of

which is explicit. The value contained in one address field (value = A) is used

directly. The other address field refers to a register whose contents are added to A

to produce the effective address.

**13.7 Briefly define relative addressing.**

Relative addressing: The implicitly referenced register is the program counter

(PC). That is, the current instruction address is added to the address field to

produce the EA.

**13.8 What is the advantage of autoindexing?**

It is typical that there is a need to increment or decrement the index register after

each reference to it. Because this is such a common operation, some systems will

automatically do this as part of the same instruction cycle, using autoindexing

**13.9 What is the difference between postindexing and preindexing?**

These are two forms of addressing, both of which involve indirect addressing and

indexing. With preindexing, the indexing is performed before the indirection.

With postindexing, the indexing is performed after the indirection.

**13.10 What facts go into determining the use of the addressing bits of an instruction?**

Number of addressing modes.

Number of operands: Typical instructions on

today's machines provide for two operands.

Register versus memory: The

more that registers can be used for operand references, the fewer bits are needed.

Number of register sets: More the Better

Address range: This matters

Address granularity.

**13.11 What are the advantages and disadvantages of using a variable-length instruction format?**

Advantages: It easy to provide a large repertoire of opcodes, with different

opcode lengths. Addressing can be more flexible, with various combinations of

register and memory references plus addressing modes.

Disadvantages: an

increase in the complexity of the CPU.