计算机组成原理作业02

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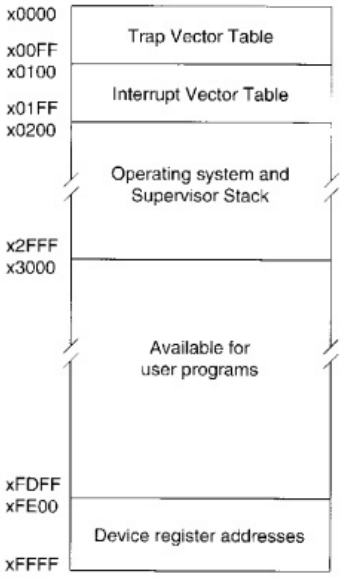
ISA要定义哪些内容?

- memory address space Address are numbed from 0 and memory-mapped I/O device reg.Certain mem are reserved for special uses as described below



- bit numbering its of all quantities are numbered, from right to left, starting with bit 0. The leftmost bit of the contents of a memory location is bit 15.
- Instructions
  Instructions are 16 bits wide. Bits [15:12] specify the opcode needed to execute the instruction.
- Illegal opcode exception
  Bits [15:12] = 1101 has not been specified.If an instruction contains 1101 in bits [15:12], an illegal opcode exception occurs.
- Program counter A register containing the address of the next instruction to be processed.
- General purpose registers
- Condition codes
- Memory-mapped I/O
  Input and output are handled by load/store instructions using memory addresses to designate each I/O device register.
- Interrupt processing
  I/O devices have the capability of interrupting the processor.

- Priority
- Processor status register (PSR) containing status information about the currently executing process.
- Privilege mode
  The LC-3 specifies two levels of privilege, Supervisor mode (privileged and User mode (unprivileged). Interrupt service routines execute in Supervisor mode. The privilege mode is specified by PSR[15]. PSR[15J = 0 indicates Supervisor mode; PSR[15] = 1 indicates User mode.
- Privilege mode exception
- supervisor stack
- user stack

windows 可执行程序exe 的格式

XE文件分为两个部分: EXE文件头和程序本体。exe文件比较复杂，属于一种多段的结构，是DOS最成功和复杂的设计之一。每个exe文件包含一个文件头和一个可重定位程序的映像。文件头包含MS-DOS用于加载程序的信息，例如程序的大小和寄存器的初始值。文件头还指向一个重定位表，该表包含指向程序映像中可重定位段地址的指针链表。MS-DOS通过把该映像直接从文件复制到内存加载exe程序，然后调整定位表中说明的可重定位段地址。定位表是一个重定位指针数组，每个指向程序映像中的可重定位段地址[1]。
EXE 文件比较复杂，每个EXE文件都有一个文件头,结构如下：
EXE文件头信息

```
————————————————————
├ 偏移量 ┤  意义  ┤├00h-01h ┤MZ'EXE文件标记  ┤
├2h-03h  ┤文件长度除512的余数  ┤
├04h-05h ┤...............商  ┤
├06h-07h ┤重定位项的个数  ┤
├08h-09h ┤文件头除16的商  ┤
├0ah-0bh ┤程序运行所需最小段数 ┤
├0ch-0dh ┤..............大.... ┤
├oeh-0fh ┤堆栈段的段值 (SS) ┤
├10h-11h ┤........sp  ┤
├12h-13h ┤文件校验和  ┤
├14h-15h ┤IP  ┤
├16h-17h ┤CS  ┤
├18h-19h ┤.............  ┤
├1ah-1bh ┤.............  ┤
├1ch  ┤.............  ┤
————————————————————————
```

.EXE文件包含一个文件头和一个可重定位程序映象。文件头包含MS-DOS用于加载程序的信息，例如程序的大小和寄存器的初始值。文件头还指向一个重定位表，该表包含指向程序映象中可重定位段地址的指针链表。文件头的形式与EXEHEADER结构对应：

```
EXEHEADER STRUC
```

```
exSignature dw 4D5AH ;.EXE标志
exExraBytes dw ? ;最后(部分)页中的字节数
exPages dw ? ;文件中的全部和部分页数
exRelocItems dw ? ;重定位表中的指针数
exHeaderSize dw ? ;以字节为单位的文件头大小
exMinAlloc dw ? ;最小分配大小
exMaxAlloc dw ? ;最大分配大小
exInitSS dw ? ;初始SS值
exInitSP dw ? ;初始SP值
exChechSum dw ? ;补码校验值
exInitIP dw ? ;初始IP值
exInitCS dw ? ;初始CS值
exRelocTable dw ? ;重定位表的字节偏移量
exOverlay dw ? ;覆盖号
```