HP series 80

počítače s procesorem Capricorn

Bytefest 2022, dex

series 80

- zdokonalení a zlevnění řady 98xx (16bit → 8bit), VisiCalc
- HP 83/85A/85B/9915A/9915B
- HP 86A/86B
- HP-87/87XM
- *HP-75c, HP-75d (kalkulačka s Basicem)*

HP 85

- 83 16 KiO RAM, bez tiskárny a pásky
- 85A 16 KiO RAM
- 85B 64 KiO RAM (32/Edisk), Mass Storage, I/O
- 9915A/B rack

HP 86

- 86A 64 KiO RAM, Centronics + 2x 9130
- 86B 128 KiO RAM (Edisk), HP/IB

HP 87

- 87 32 KiO RAM, HP-IB
- 87XM 128 KiO RAM, HP-IB

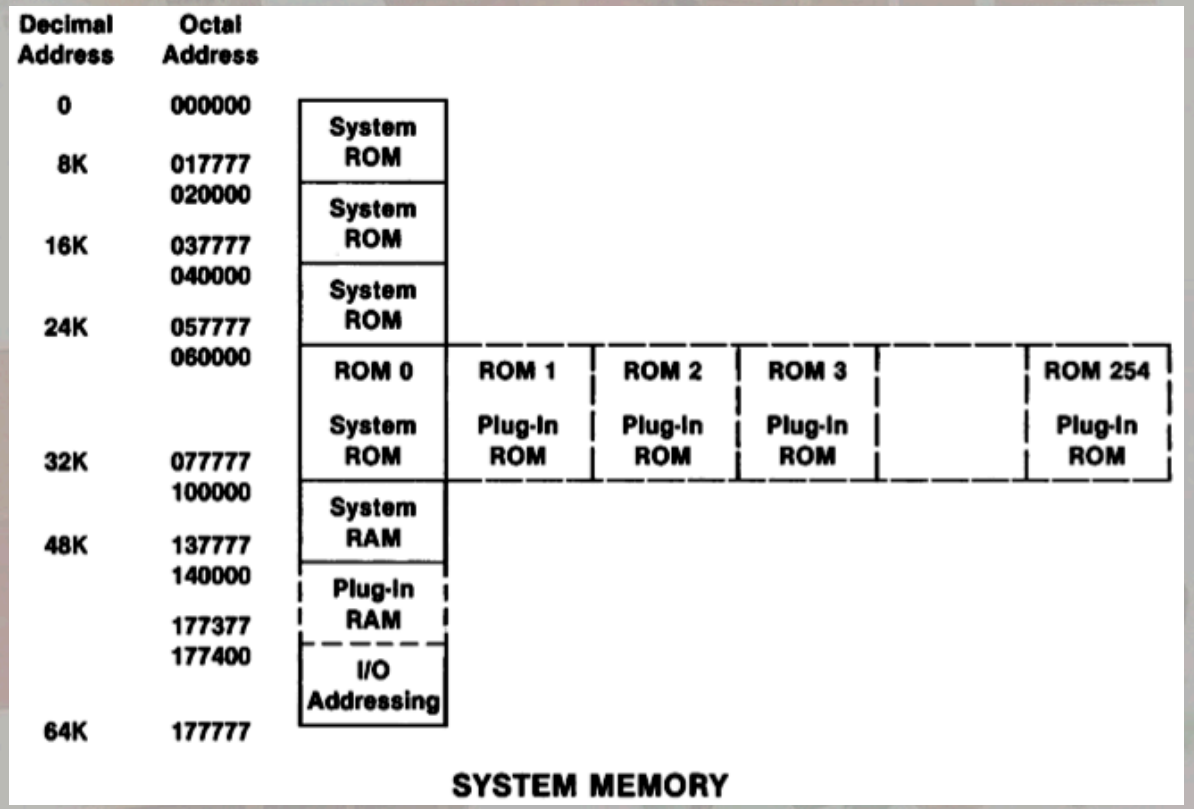
grafické možnosti

- 32x16, 256x192
- 1980-1987, *ext. ROM bílá*

- 80x24, 544x240
- 1982-1987, *ext. ROM žlutá*

- 80x24 (80x16), 544x240
- 1982-1984, *ext. ROM žlutá*

mapa paměti


Decimal Address
Octal Address
0
000000
8K
017777
020000
16K
037777
040000
24K
057777
060000
32K
077777
100000
48K
137777
140000
177377
177400
64K
177777
System ROM
System ROM
System ROM
ROM 0
System ROM
ROM 1
Plug-In ROM
ROM 2
Plug-In ROM
ROM 3
Plug-In ROM
ROM 254
Plug-In ROM
System RAM
Plug-In RAM
I/O Addressing
SYSTEM MEMORY

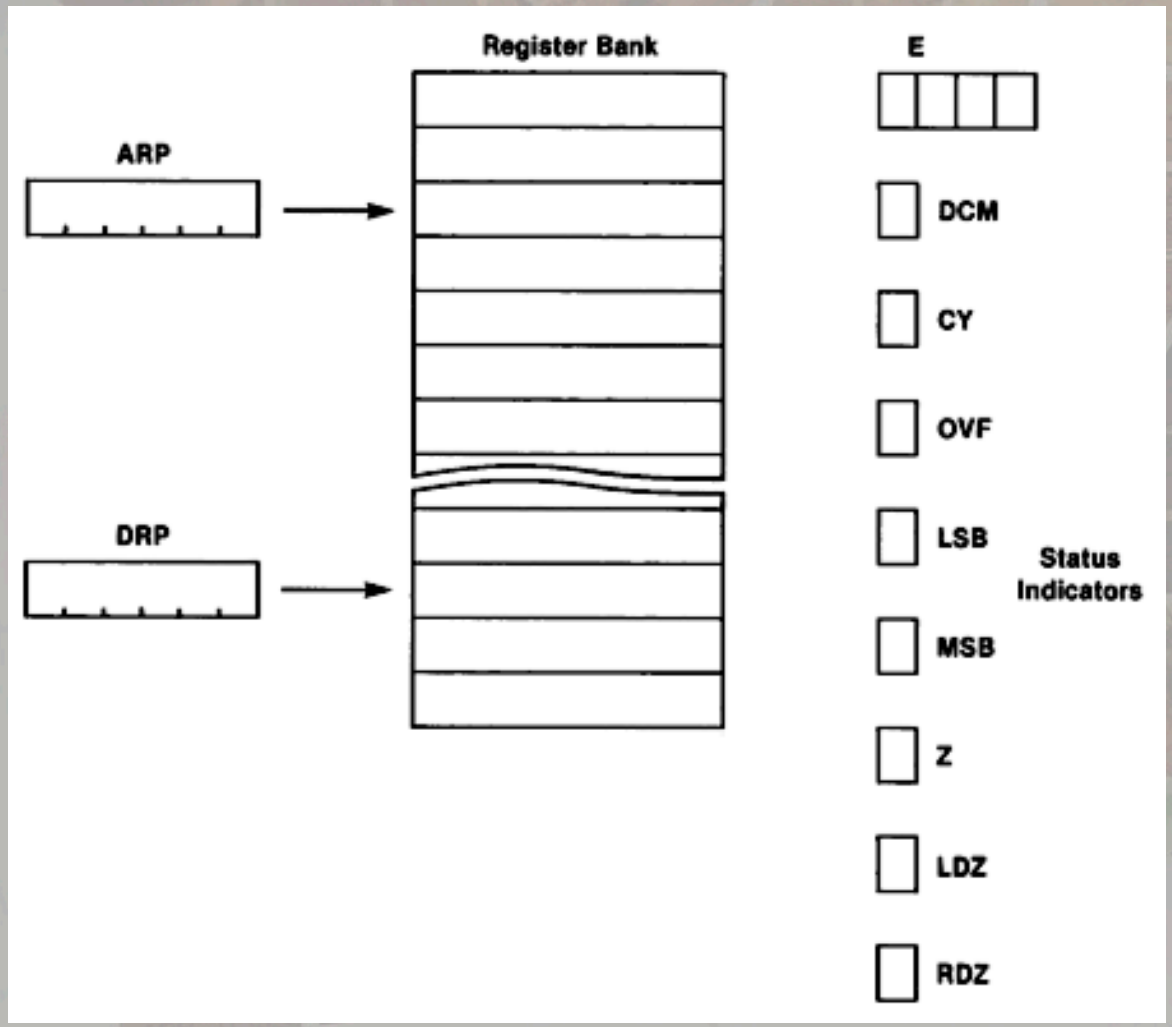
premisy

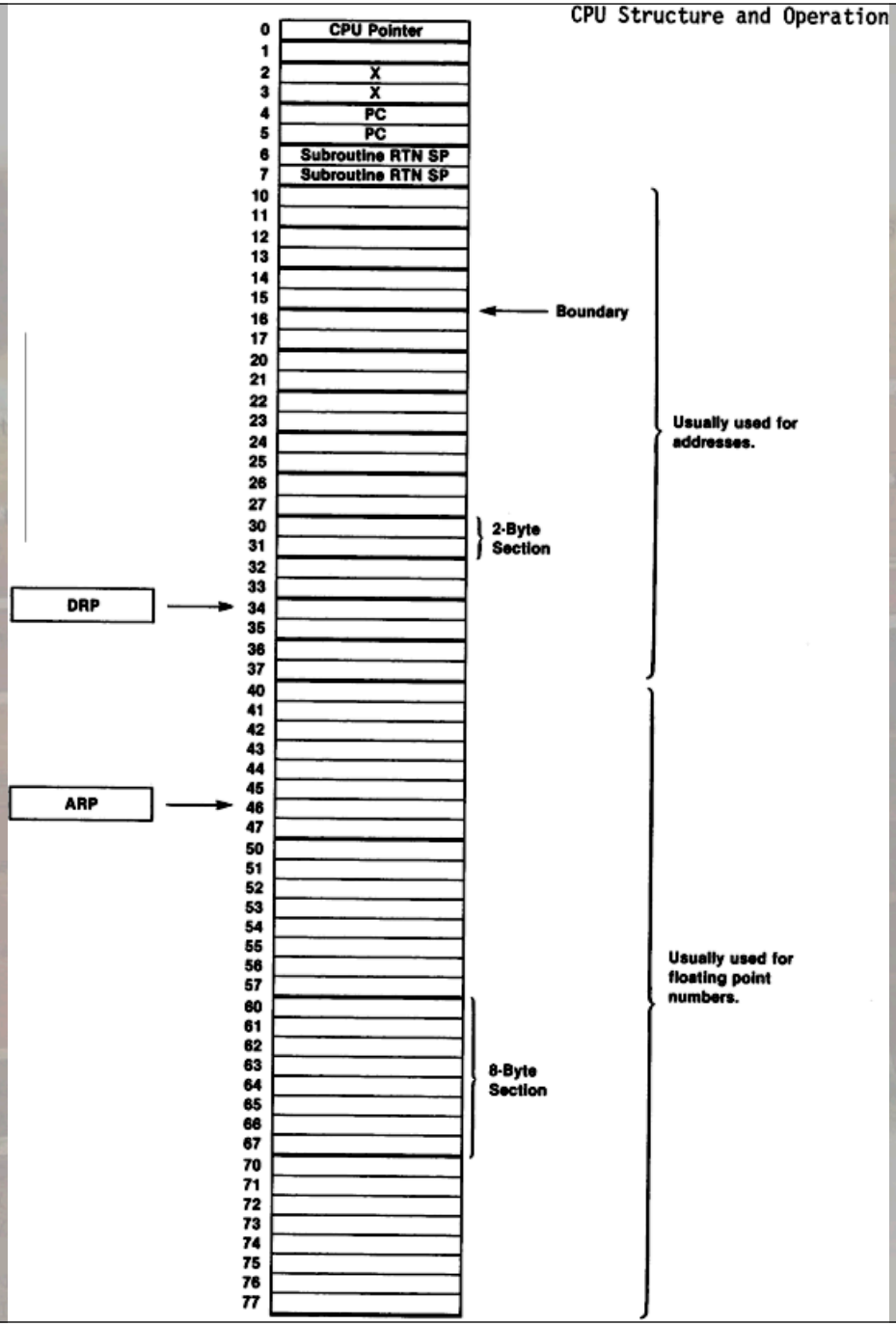
- akumulátor je "hrdlo flašky"
- registry jsou rychlejší než RAM
- jeden zásobník je málo

propozice

- provádět operaci na více registrech naráz
- zásobníky +, -, index

procesor


Register Bank
E
ARP
DCM
CY
OVF
DRP
LSB
Status
Indicators
MSB
Z
LDZ
RDZ


0 CPU Pointer
1
2 X
3 X
4 PC
5 PC
6 Subroutine RTN SP
7 Subroutine RTN SP
10
11
12
13
14
15
16
17
20
21
22
23
24
25
26
27
30
31
32
33
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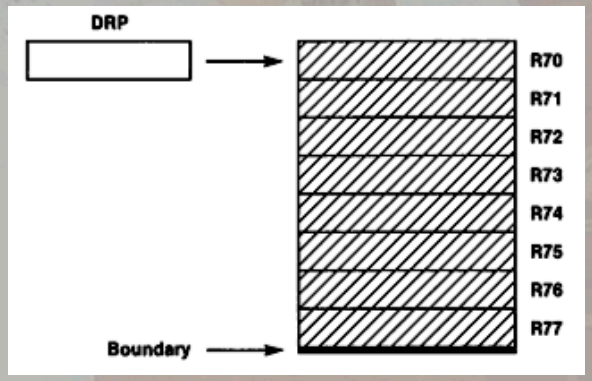
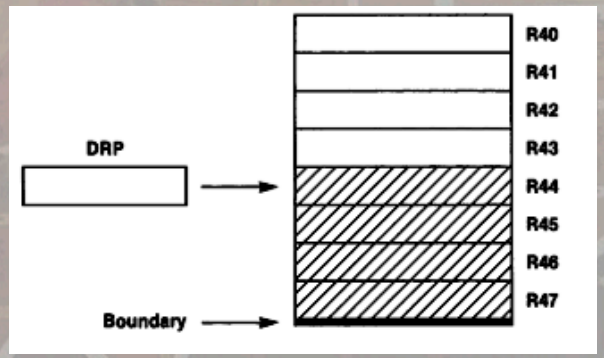
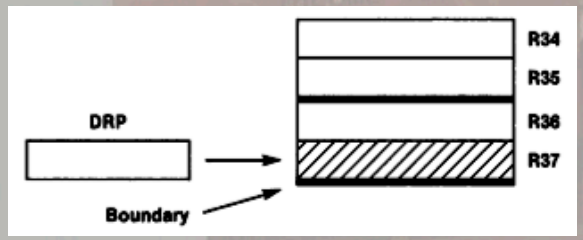
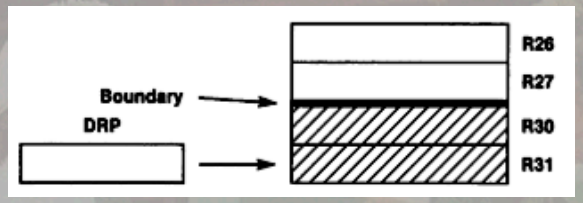
55
56
57
60
61
62
63
64
65
66
67
70
71
72
73
74
75
76
77
Boundary
2-Byte Section
DRP
ARP
8-Byte Section
Usually used for addresses.
Usually used for floating point numbers.

multi- a single-byte



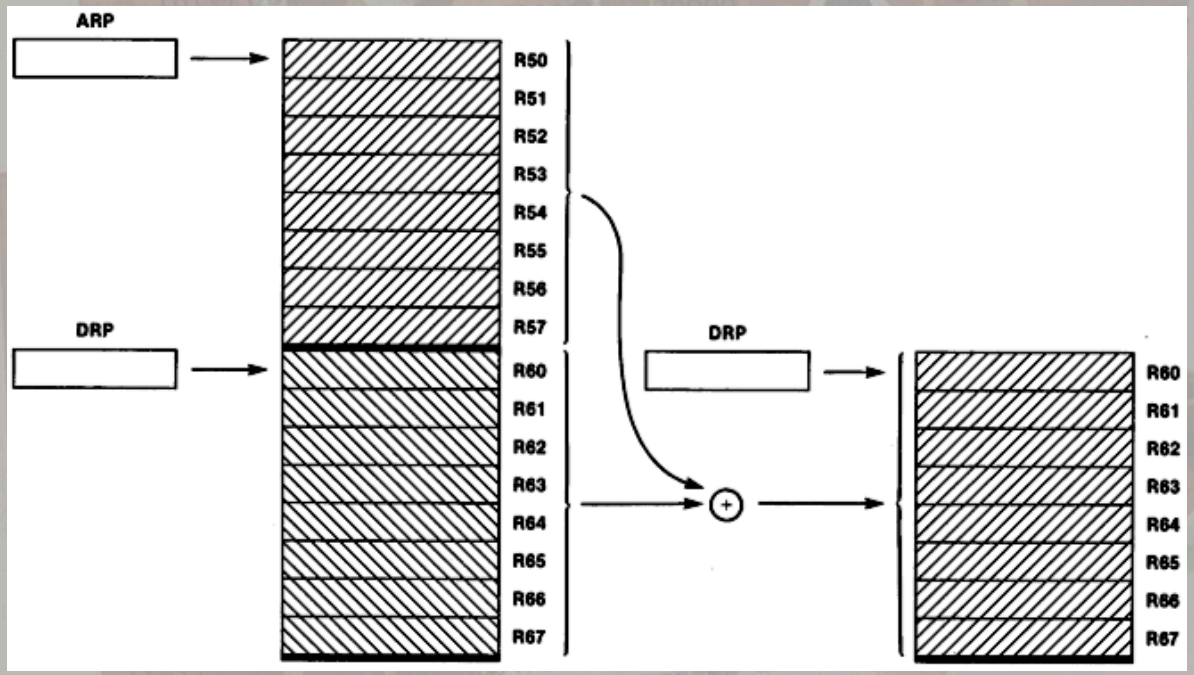




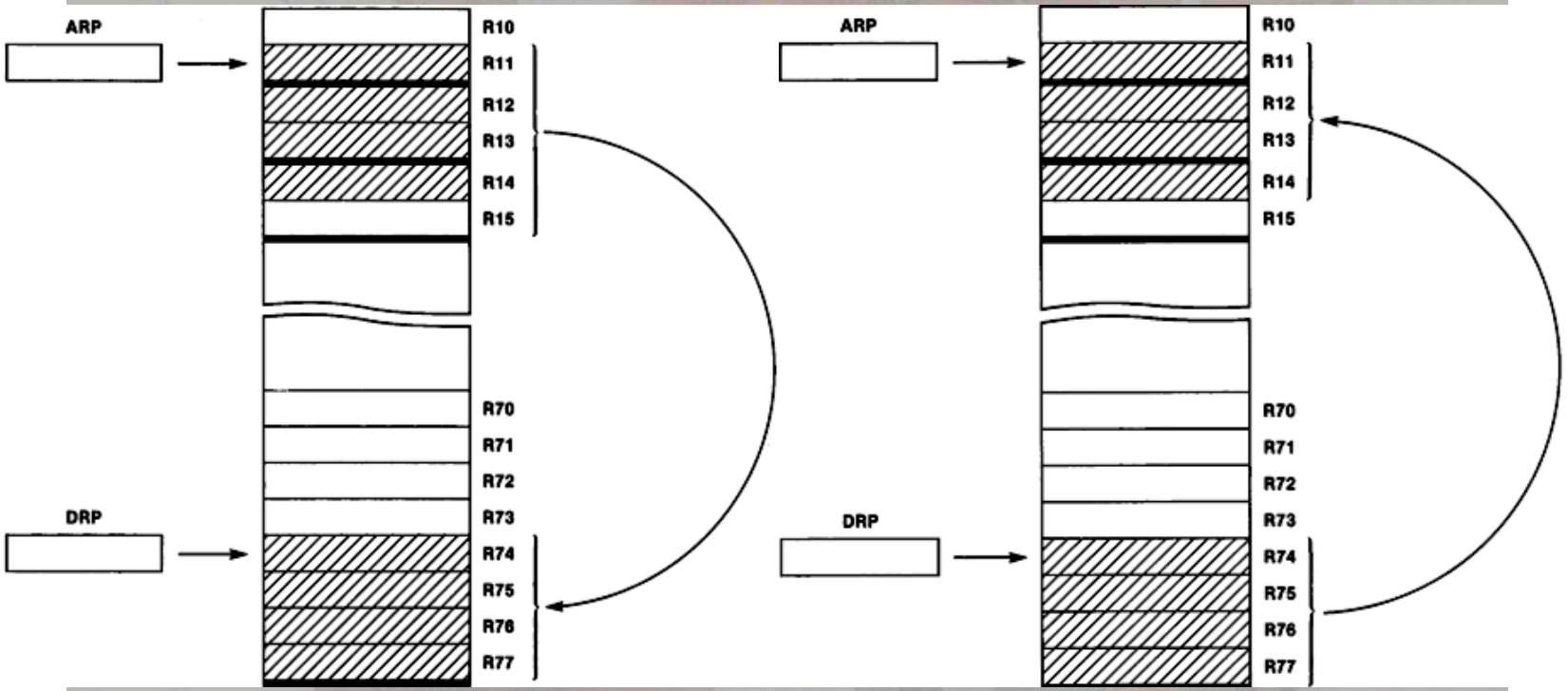


multi-byte shift right

multi-byte instrukce s dvěma parametry



multibyte load a store



příznaky

- E (4bit extend register)
- DCM - decimal mode (BCD)
- CY - carry
- OVF - overflow
- LSB - least significant bit (single byte)
- MSB - most significant bit (single byte)
- Z - zero
- LDZ - left digit zero (MS nibble, multibyte)
- RDZ - right digit zero (LS nibble, multibyte)

assembler

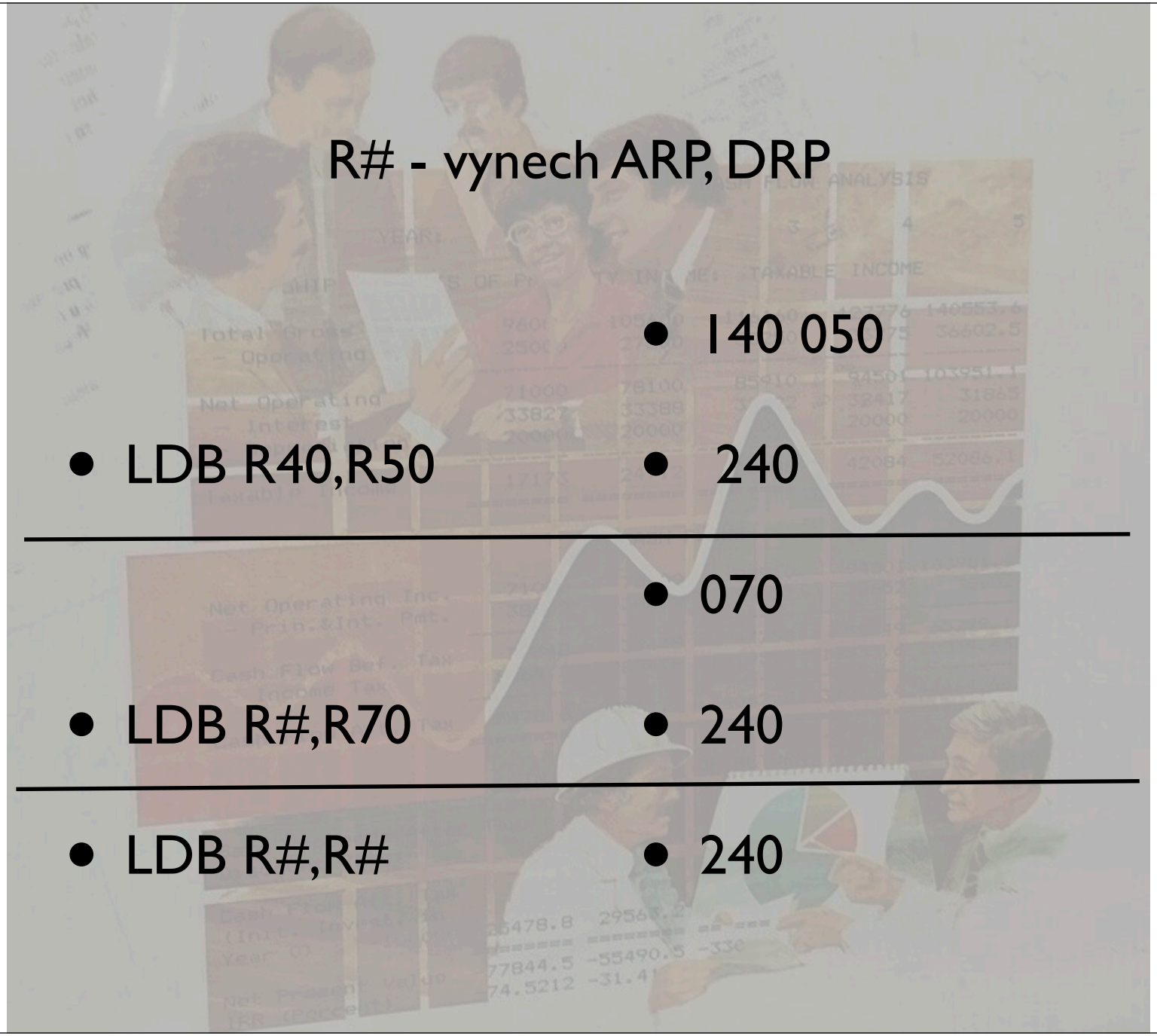
- R*
- R#
- X

```
60 LBL LDMD R70,R40
70 Label jsb=numval
80  PUBD R52,+R12
90  PUBD 52,+12
100  CLB R40 !THIS IS A COMMENT
```

```
LDB R0, = 26

LDB R*, R30

STB R40, R*
```

- ARP (R*, ARP 1=R0) - nastav ARP 000-077, ARP 1 001
- DRP (R*, DRP 1=R0) - nastav DRP 100-177, DRP 1 101

```
LDB RØ, = 26

LDB R*, R30

STB R40, R*
```

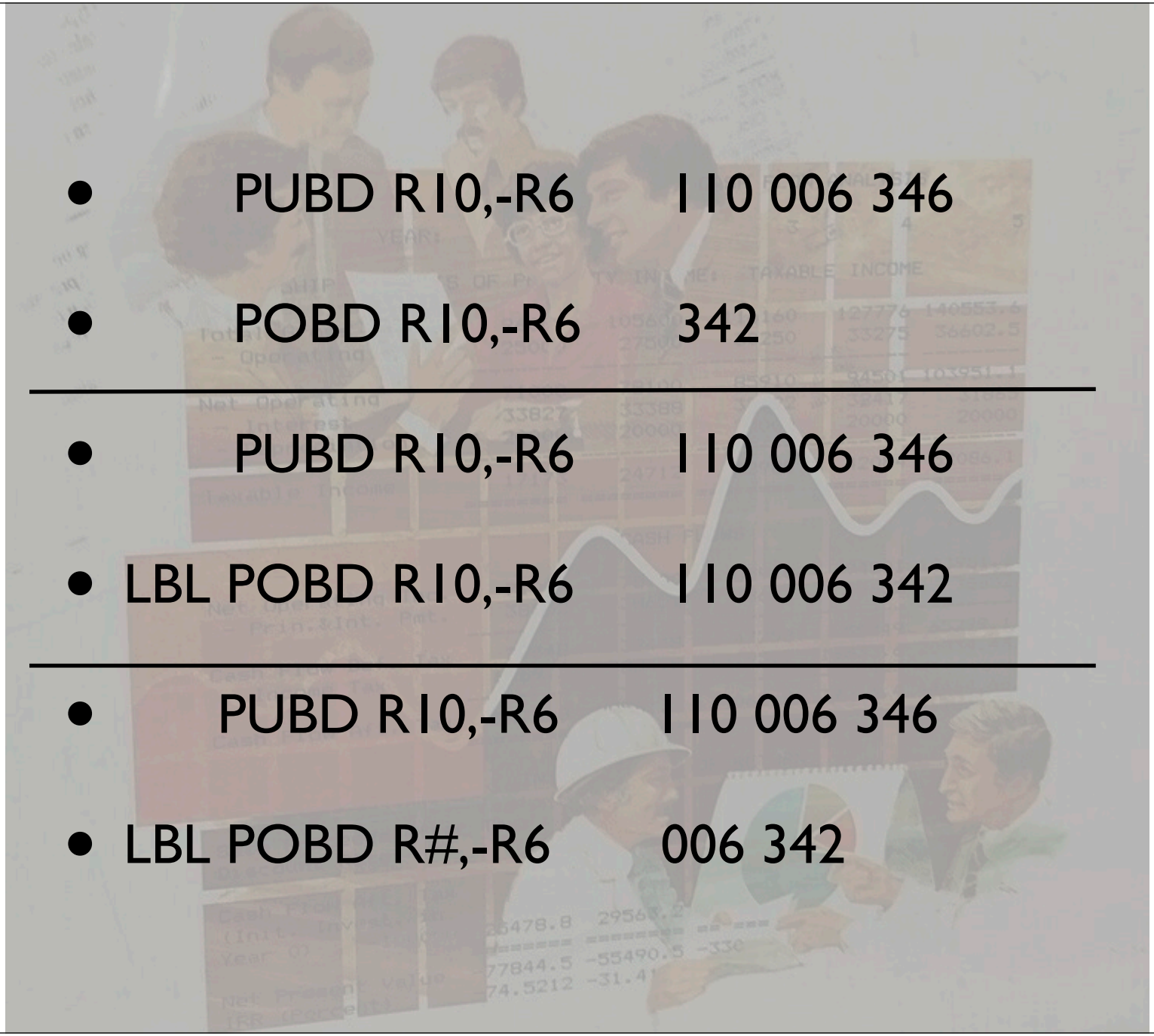


R# - vynech ARP, DRP

- LDB R40,R50
  - 140 050
  - 240

- LDB R#,R70
  - 070
  - 240

- LDB R#,R#
  - 240

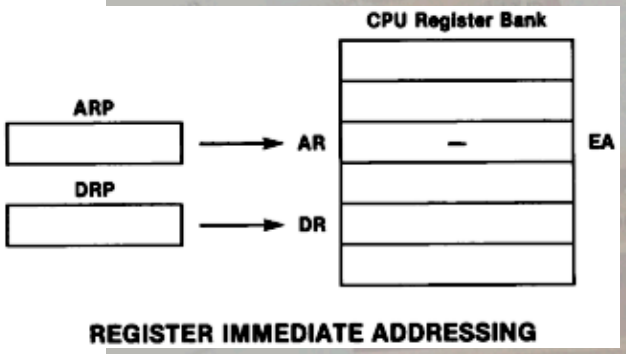


- PUBD R10,-R6 110 006 346
- POBD R10,-R6 342

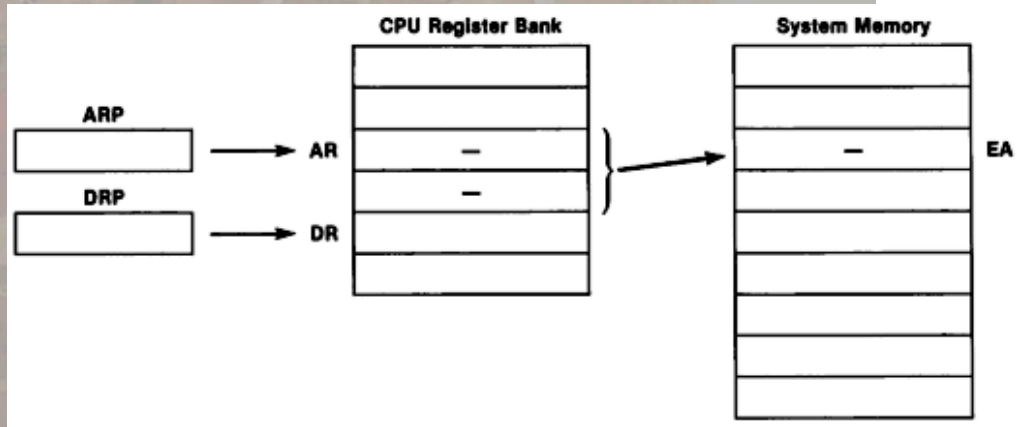
- PUBD R10,-R6 110 006 346
- LBL POBD R10,-R6 110 006 342

- PUBD R10,-R6 110 006 346
- LBL POBD R#,-R6 006 342

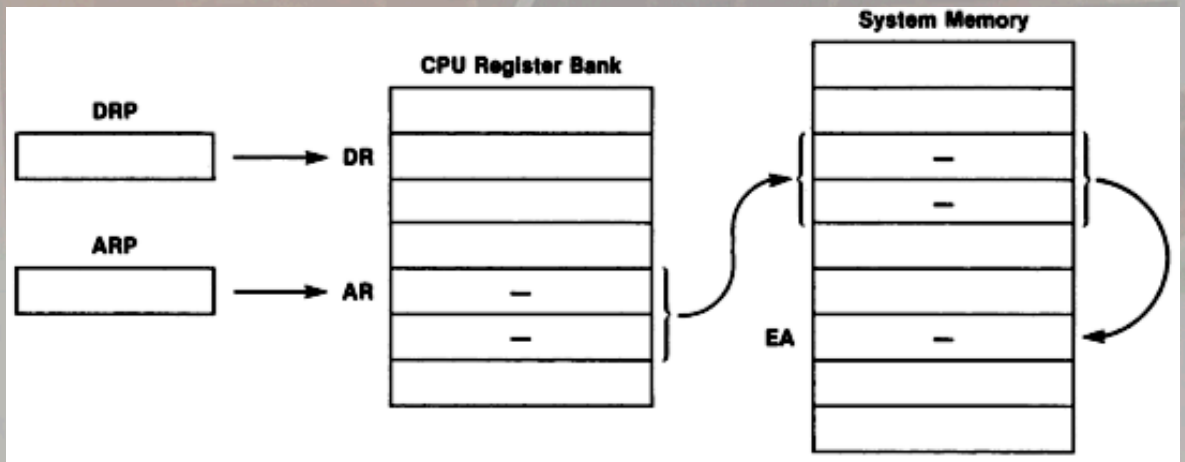
adresování registrem



REGISTER IMMEDIATE ADDRESSING

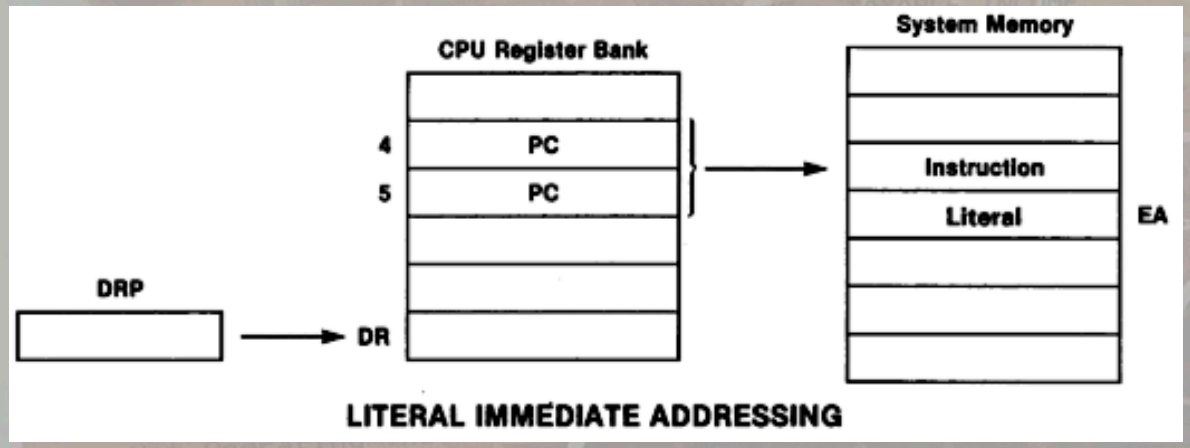


REGISTER DIRECT ADDRESSING

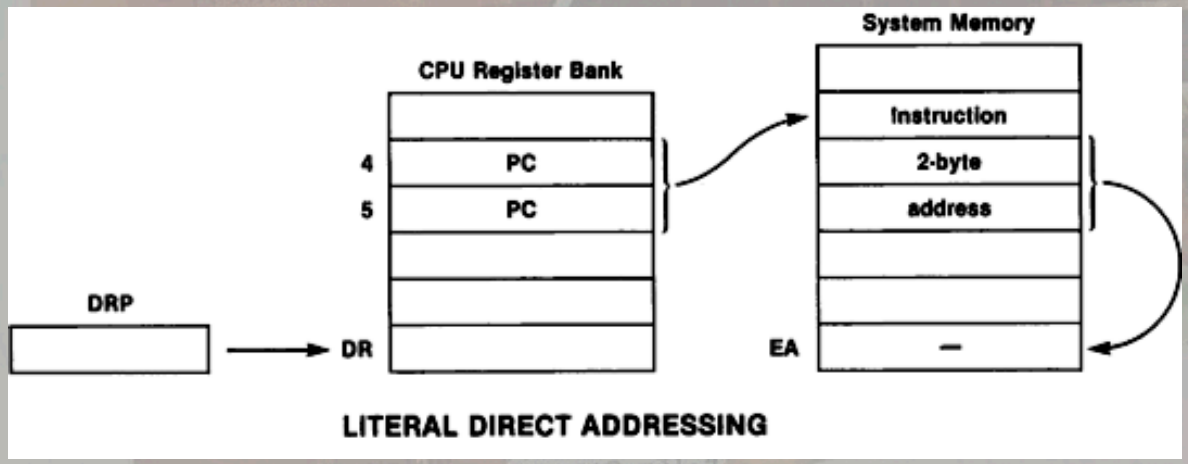


REGISTER INDIRECT ADDRESSING

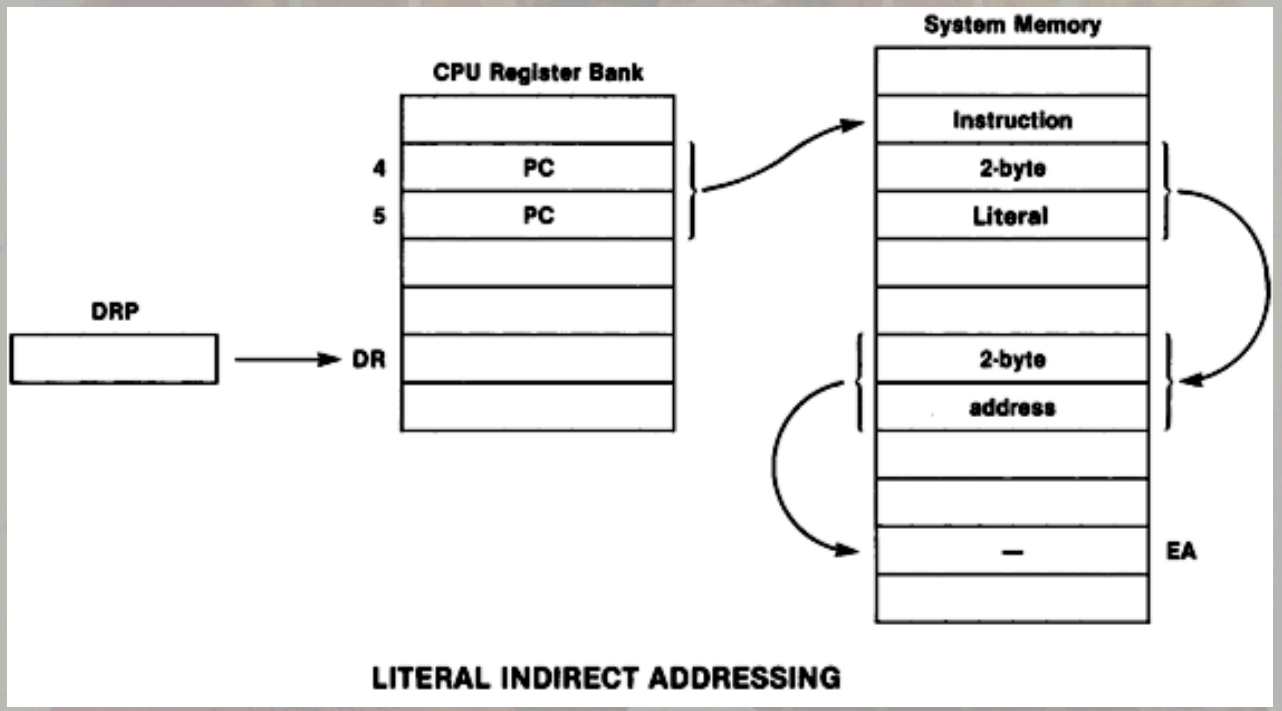
adresování literálem (=)



LITERAL IMMEDIATE ADDRESSING

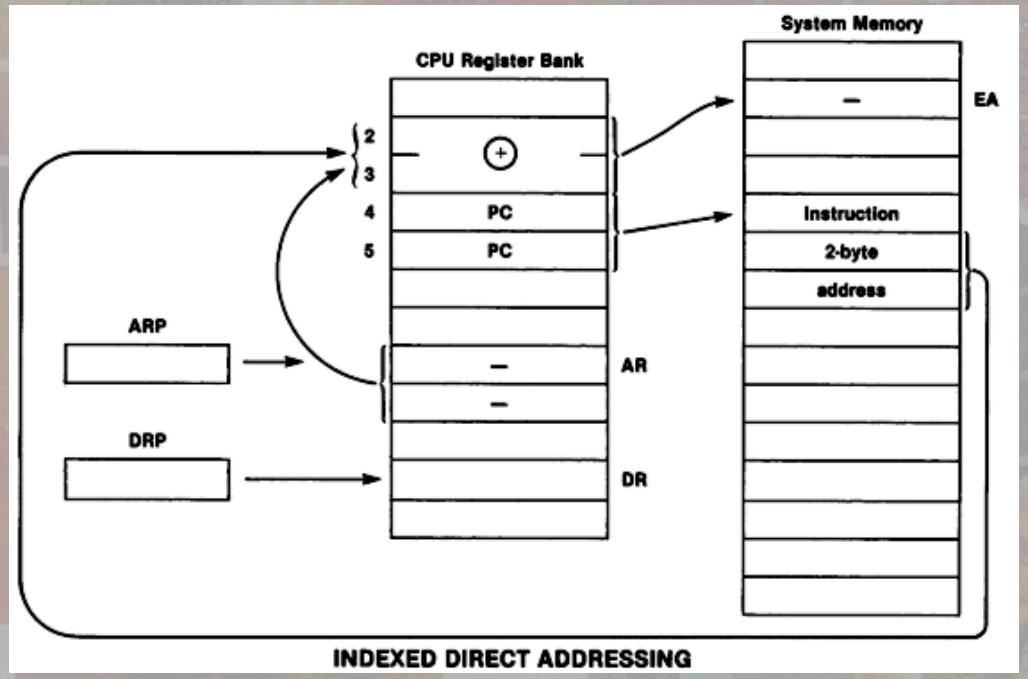


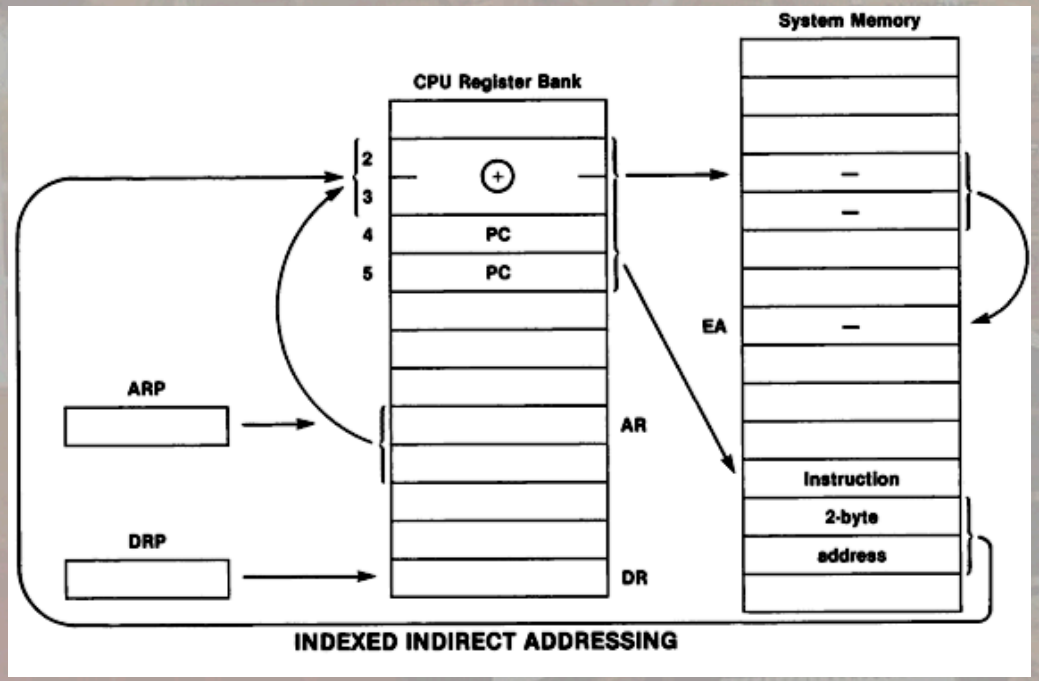
LITERAL DIRECT ADDRESSING



LITERAL INDIRECT ADDRESSING

adresování indexem (třetí parametr X)

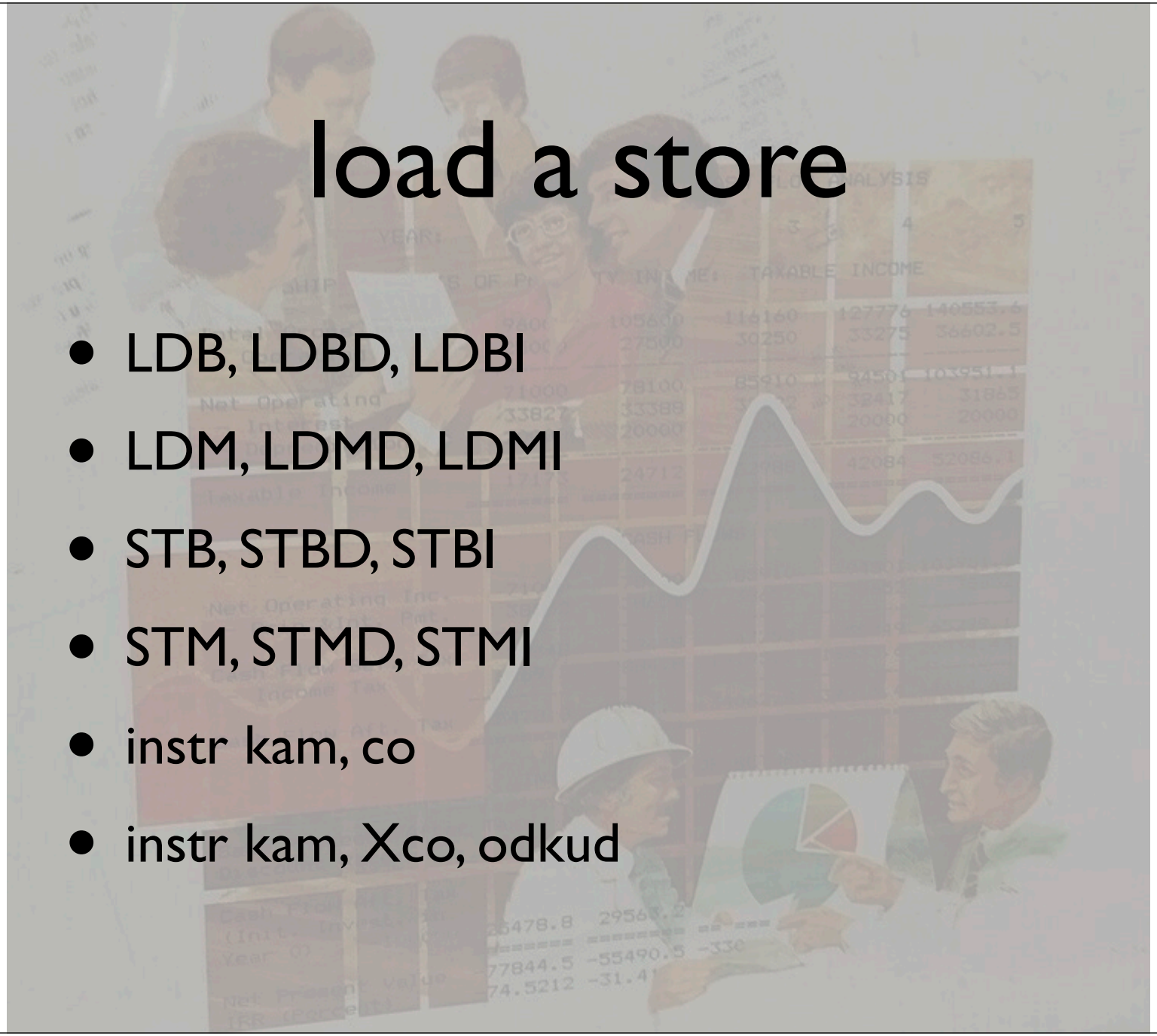




INDEXED INDIRECT ADDRESSING

load a store

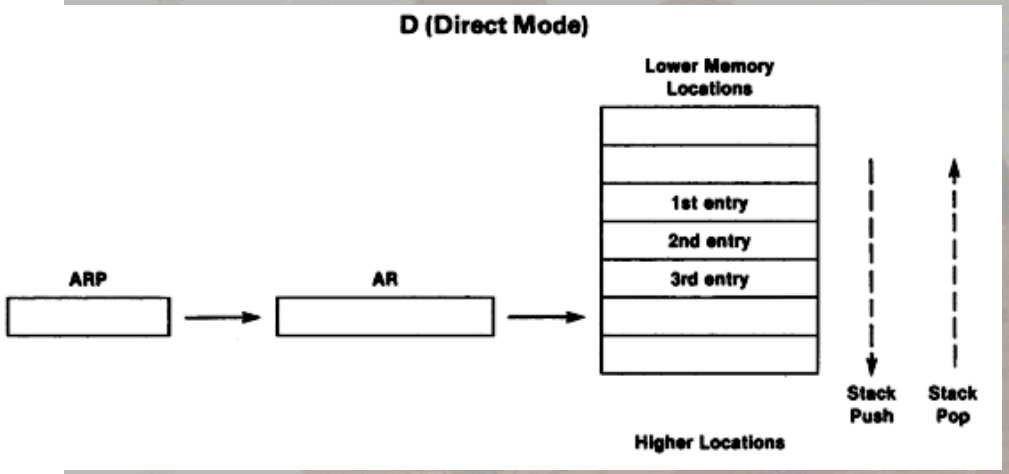
- LDB, LDBD, LDBI
- LDM, LDMD, LDMI
- STB, STBD, STBI
- STM, STMD, STMI
- instr kam, co
- instr kam, Xco, odkud

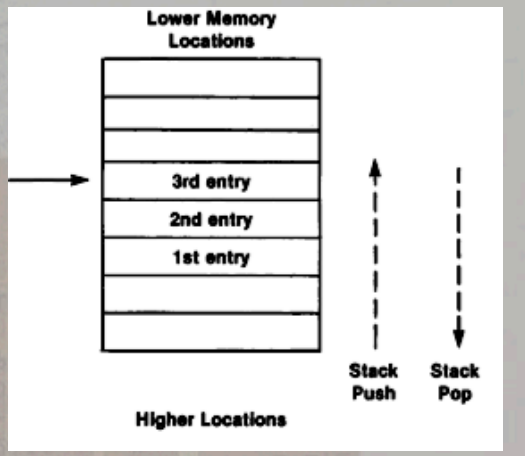


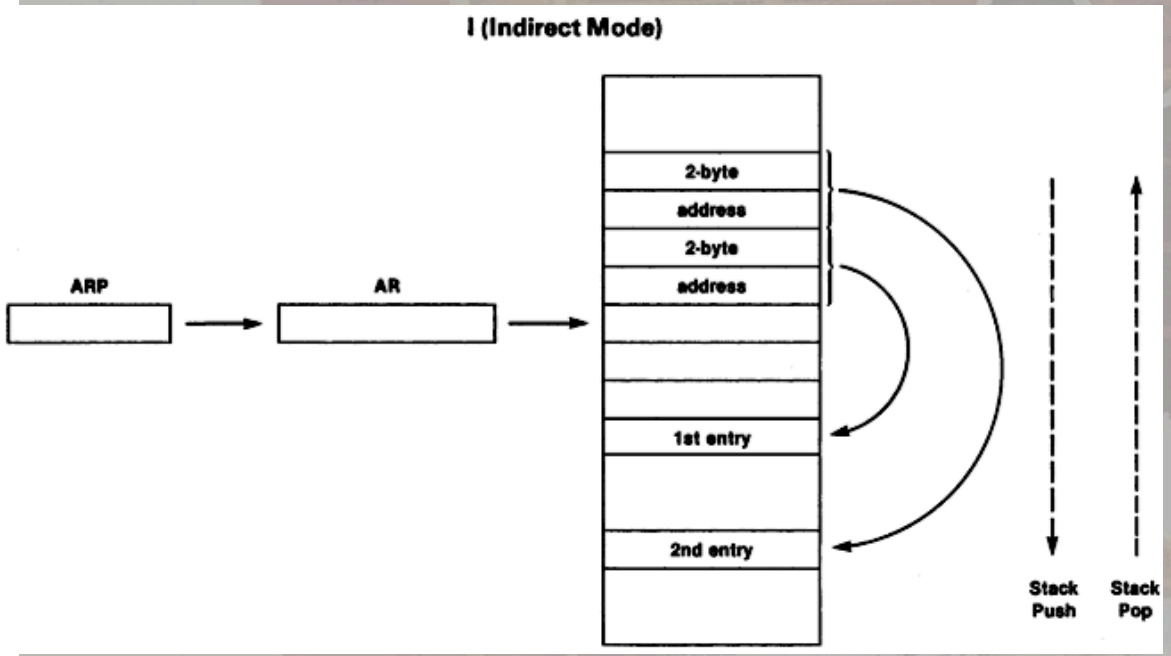
zásobník

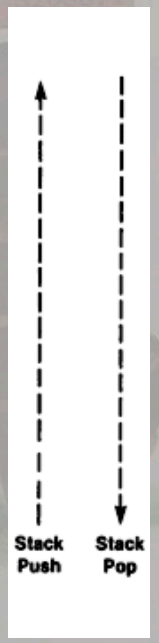
- PU PO single- nebo multi-byte
- rostoucí nebo klesající (+/-)
- direct, indirect

PUBD DR, -AR	Push byte direct with decrement
PUMD DR, -AR	Push multi-byte direct with decrement
PUBI DR, -AR	Push byte indirect with decrement
PUMI DR, -AR	Push multi-byte indirect with decrement
POBD DR, +AR	Pop byte direct with increment
POMD DR, +AR	Pop multi-byte direct with increment
POBI DR, +AR	Pop byte indirect with increment
POMI DR, +AR	Pop multi-byte indirect with increment

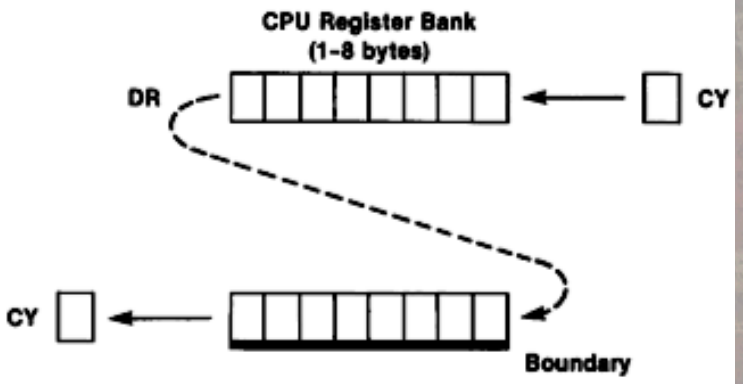

D (Direct Mode)
Lower Memory Locations
1st entry
2nd entry
3rd entry
ARP
AR
Stack Push
Stack Pop
Higher Locations

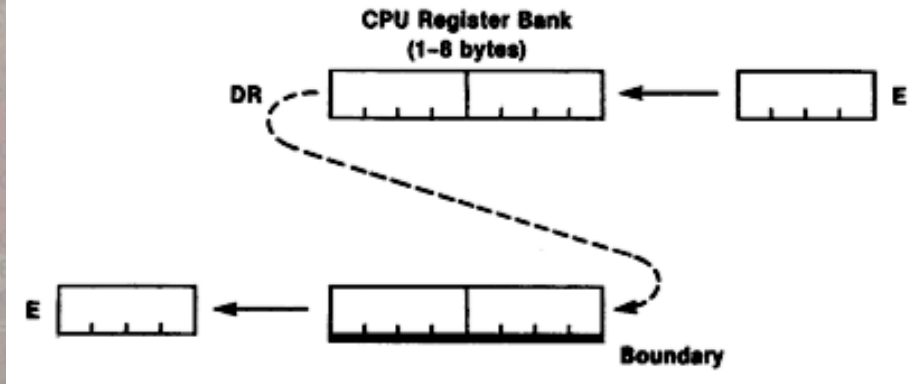

Lower Memory Locations
3rd entry
2nd entry
1st entry
Stack Push
Stack Pop
Higher Locations


I (Indirect Mode)
2-byte address
2-byte address
1st entry
2nd entry
ARP
AR
Stack Push
Stack Pop

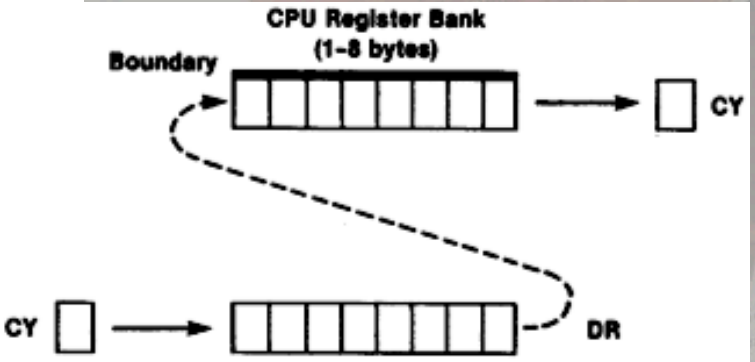

Stack Push
Stack Pop

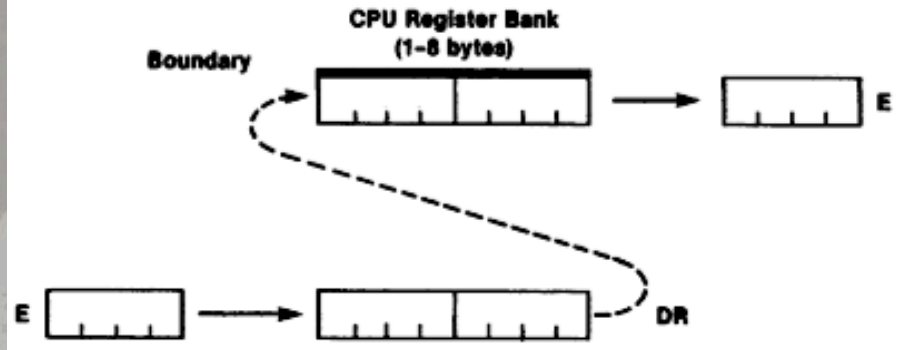
rotace

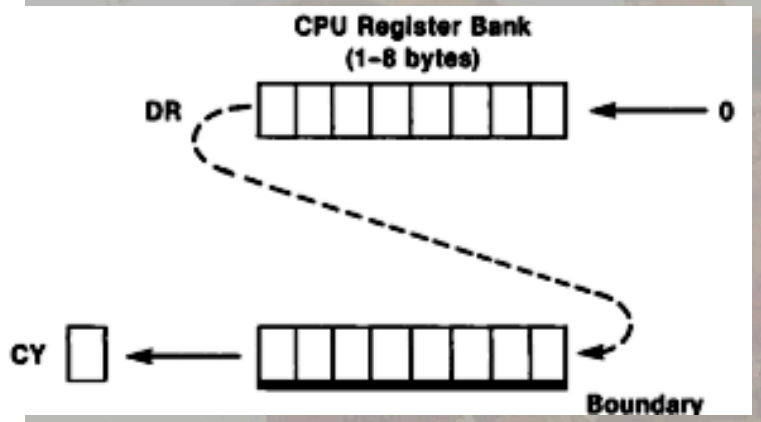


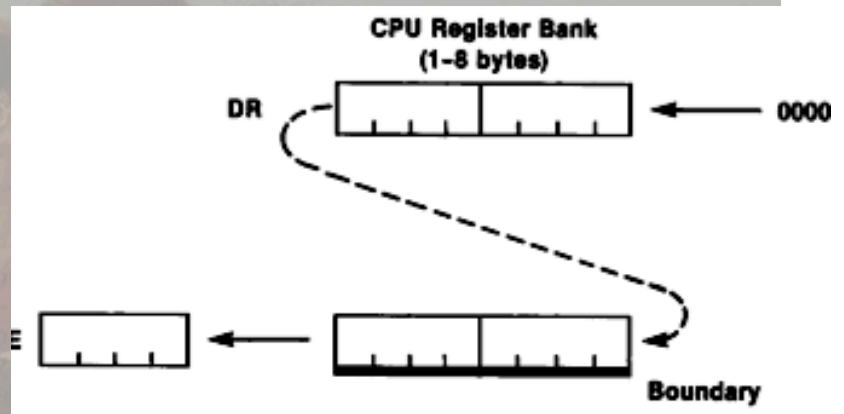


- binary, decimal
- extended shift left/right (single, multi)

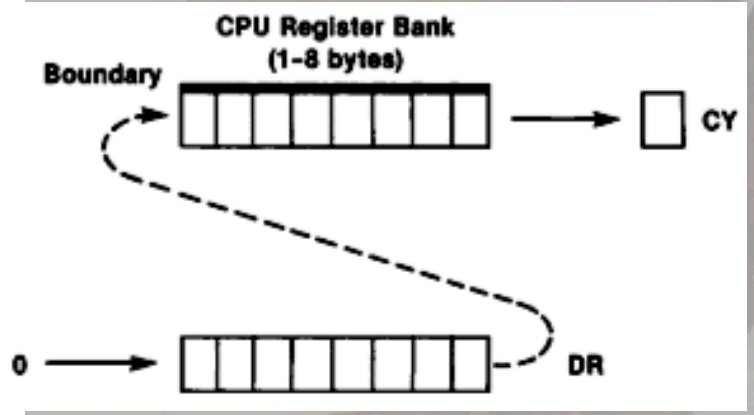


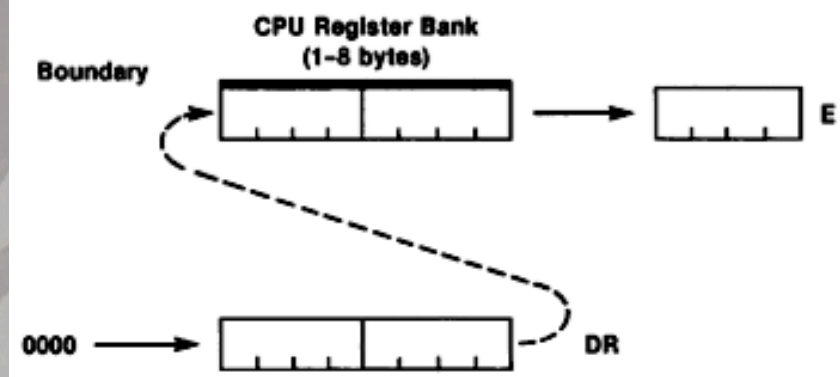




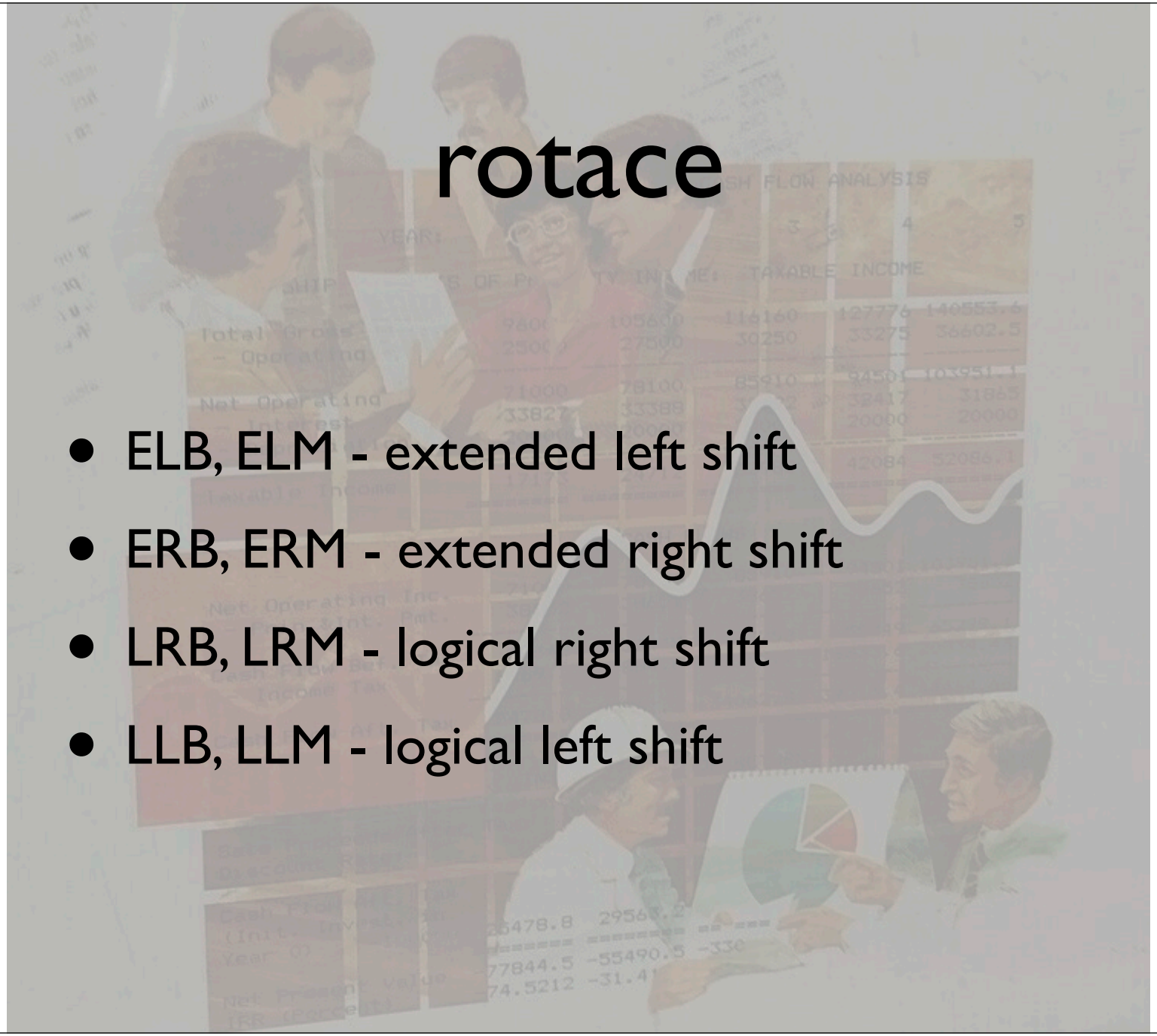


- logical shift left/right (single, multi)

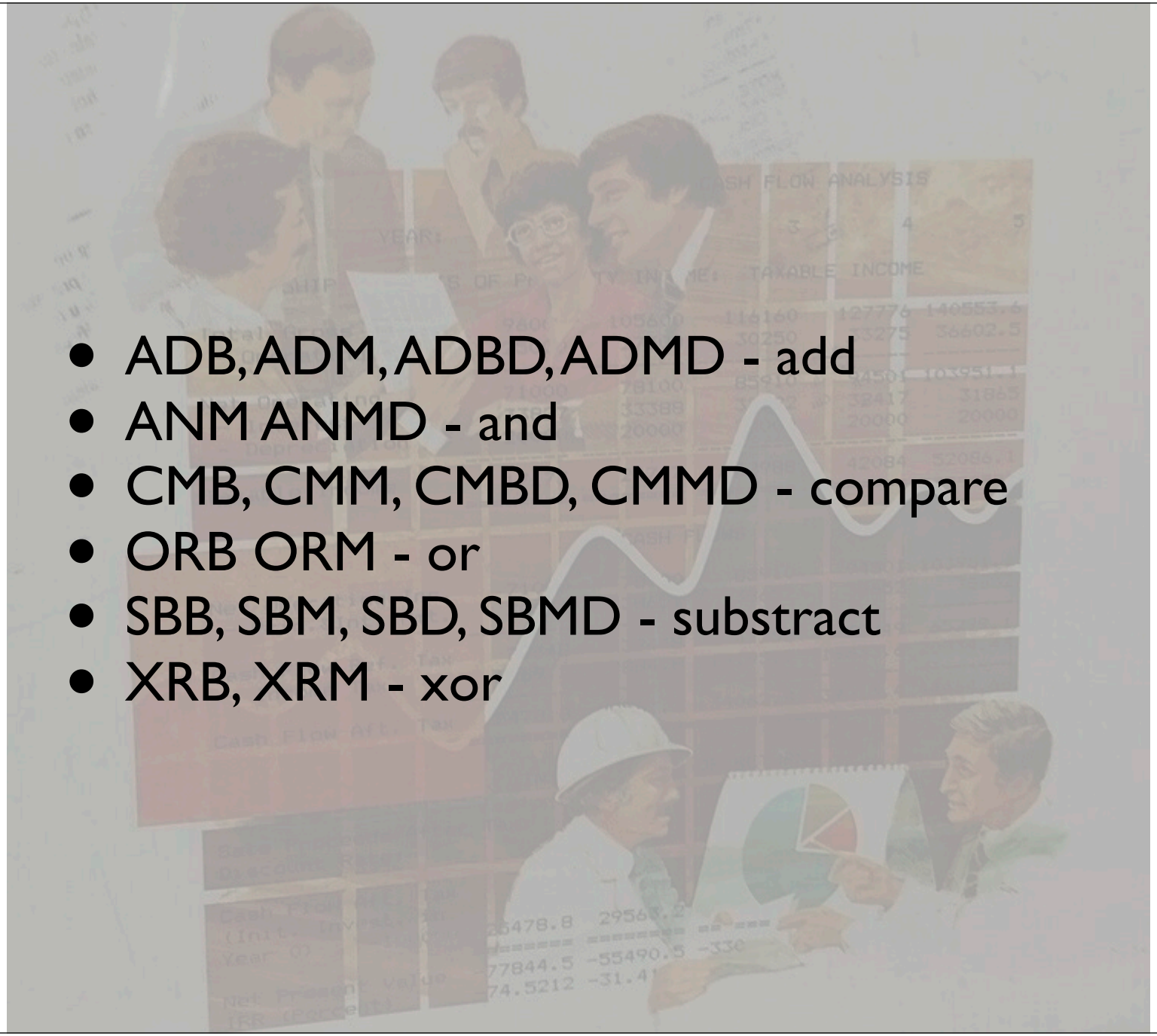




rotace

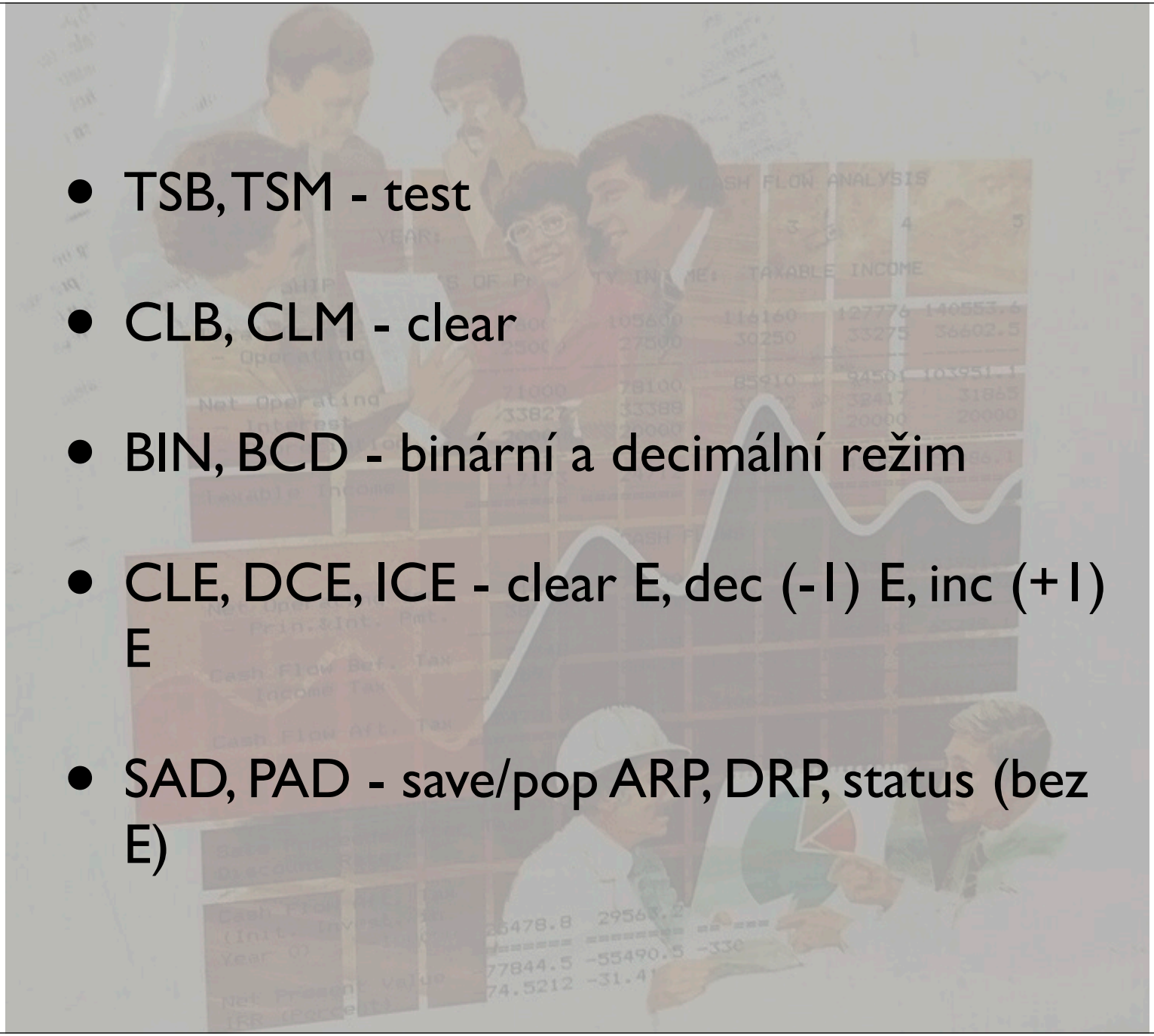


- ELB, ELM - extended left shift
- ERB, ERM - extended right shift
- LRB, LRM - logical right shift
- LLB, LLM - logical left shift

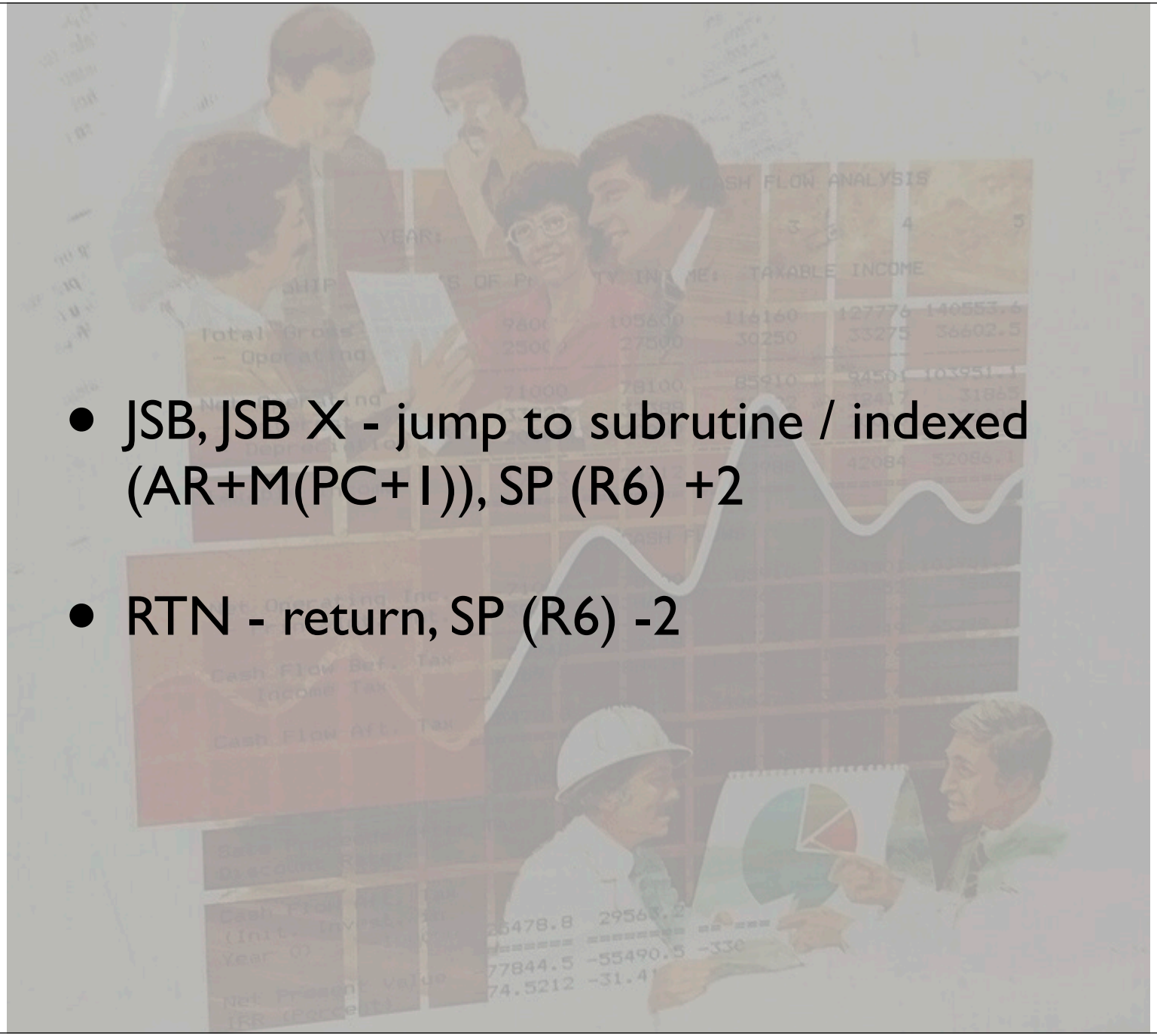


- ADB, ADM, ADBD, ADMD - add
- ANM ANMD - and
- CMB, CMM, CMBD, CMMD - compare
- ORB ORM - or
- SBB, SBM, SBD, SBMD - substract
- XRB, XRM - xor

- DCB, DCM - dekrement (+ dvojkový, desítkový doplněk)
- ICB, ICM - inkrement (+1 dvojková, desítková)
- NCB, NCM - doplněk (jednotkový, devítkový)
- TCB, TCM - doplněk (dvojkový, desítkový)



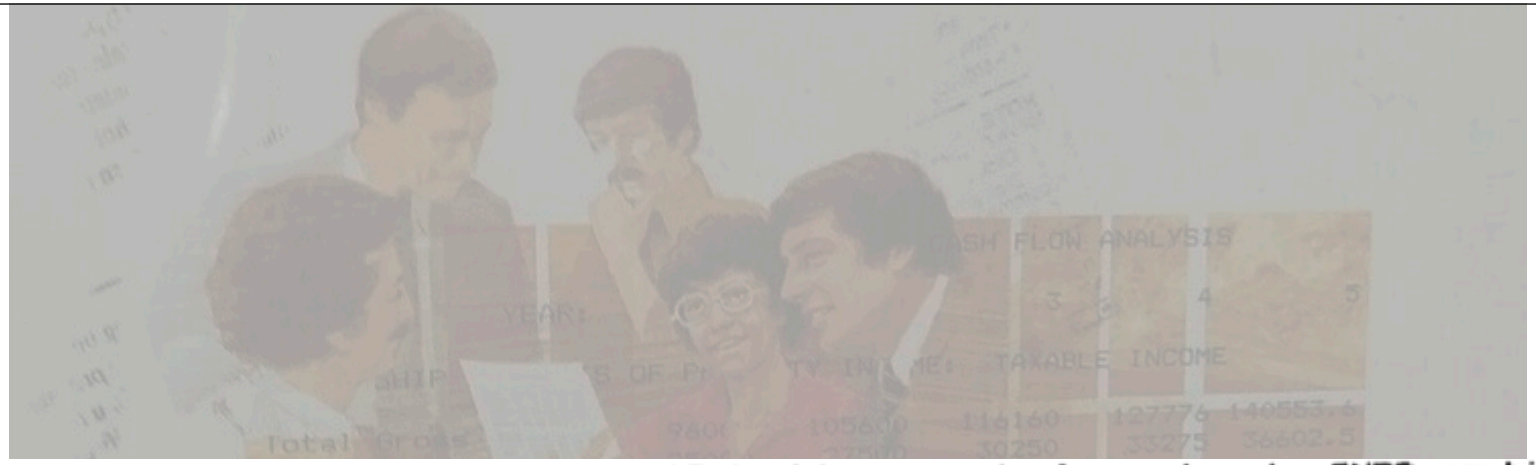
- TSB, TSM - test
- CLB, CLM - clear
- BIN, BCD - binární a decimální režim
- CLE, DCE, ICE - clear E, dec (-1) E, inc (+1) E
- SAD, PAD - save/pop ARP, DRP, status (bez E)



- JSB, JSB X - jump to subrutine / indexed (AR+M(PC+1)), SP (R6) +2
- RTN - return, SP (R6) -2

- (ne)podmíněný skok

JMP label	Unconditional jump	
JNO label	Jump on no overflow	
JOD label	Jump on odd	
JEV label	Jump on even	
JPS label	Jump on positive	Takes overflow into consideration. (Exclusive OR of MSB and OVF.)
JNG label	Jump on negative	
JZR label	Jump on zero	
JNZ label	Jump on non-zero	
JEZ label	Jump on E zero	
JEN label	Jump on E non-zero	
JCY label	Jump on carry	
JNC label	Jump on no carry	
JLZ label	Jump on left digit zero	
JLN label	Jump on left digit non-zero	
JRZ label	Jump on right digit zero	
JRN label	Jump on right digit non-zero	



```
360         BIN                         !Sets binary mode for entry to ONER routine.
370         JSB =ONER                   !Load F into R40.
380         LDM R50,R40                 !Move F into R50.
390         LDM R40,=1,0,0,0,0,0,0,32C !Load 32 into R40.
400         JSB =SUB10                  !Perform subtraction.
410         POMD R70,-R12               !Throw away copy on stack.
420         LDM R50,=0,0,0,0,0,0,0,50C !Load 5 into R50.
430         JSB =MPY10                  !Perform multiplication.
440         POMD R70,-R12               !Throw away copy on stack.
450         LDM R50,R40                 !Move intermediate result to R50.
460         LDM R40,=0,0,0,0,0,0,0,90C !Load 9 into R40.
470         JSB =DIV10                  !Perform division.
480         RTN                         !Answer is on stack, so return.
```


CASH FLOW ANALYSIS
YEAR:
TAXABLE INCOME
Total Gross
- Operating
Net Operating
- Interest
- Depreciation
Taxable Income
Net Operating Inc.
- Prin.&Int. Pmt.
Cash Flow Bef. Tax
Income Tax
Cash Flow Aft. Tax
Sale Proceeds After Tax
Discount Rate:
Cash Flow Aft. Tax
(Init. Invest. in
Year 0)
Net Present Value
IRR (Percent)