

# ՃՅՍԻ՛ճ.ՅՍՇԿ Իճ.ճԻճճճճ

Յճ. ճճճճ ճճճճ Ճճճճճճ

ՍճԿ Ի

Ð³Ù³İ³ñ·³ÛÇÝ Íñ³·ñ³íañáõÙ

¶ñ³İ³ÝáõÃÛáõÝ

1. Peter Abel. **IBM PC Assembly Language and Programming**. Fifth edition, Upper Saddle River, New Jersey, Prentice-Hall, 2001, 545 pp.
2. Kip R. Irvine. **Assembly Language for Intel-Based Computers**. Third edition, Florida International University, 1999, 676 pp.

Ð³Ù³İ³ñ·³ÛÇÝ Íñ³·ñ³íañáõÙ

¶ñ³İ³ÝáõÃÛáõÝ

1. Â. Þðîâ. *Assembler. У÷ááíèê для ВУЗ-ов.* Èçä. 2-îå, Ìèòåð, Ñ.-Ìåòåðåóðä, 2006, 637 ñòð.
2. Â. Þðîâ. *Assembler (ïðàêòèêóì).* Èçä. 2-îå, Ìèòåð, Ñ.-Ìåòåðåóðä, 2002, 395 ñòð.
3. Ñ. Çóáêîâ. *Assembler äëÿ DOS, Windows è UNIX.* Èçä. ÄìÊ, Ìñêåà, 2000, 608 ñòð.

¾É»İiñáÝ³ÛÇÝ Ñ³ßíÇã Ù»ù»Ý³Ý»ñÇ å³iÛáõÃÛáõÝÇó

- XVII <sup>13</sup>ñ (1623 Æ.) –  
·ÇiÝ³İ³Ý ì.ƐÇİ³ñ¹Ç ·áõÛ³ñáÕ-Ñ³ÝáÕ Ù»ù»Ý³
- XVII <sup>13</sup>ñ (1671 Æ.) –  
÷ÇÉÇëá÷³ »õ Û³Ã»Û³iÇİáë ¶. È»ÛµÝÇóÇ Ñ³ßí³Û»ù»Ý³
- XIX <sup>13</sup>ñ (1842 Æ.) –  
·ÇiÝ³İ³Ý »õ ÷ÇÉÇëá÷³ ´. ä³ëİ³ÉÇ Ñ³ßí³Û»ù»Ý³
- XIX <sup>13</sup>ñ (1823 - 1853 Æ.Æ.) –  
Û³Ã»Û³iÇİáë â. ´»µµÇçÇ ·³Õ³÷³ñÝ»ñ

¾É»İñáÝ³ÛÇÝ Ñ³βíÇã Ù»ù»Ý³Ý»ñÇ å³İÙáõÃÛáõÝÇó

- XX 13ñ (1946 Æ.) – ²ØÛ, ö»ÝëÇÉí³ÝÇ³, ³é³çÇÝ áõÝÇí»  
ñë³É ¾ÐØ ENIAC – 18 Ñ³½³ñ É³Ùå, ù³βÁ` 30 İ., ½µ³Õ.  
Ù³İ»ñ»ë` 200 ù.Ù. ²βË³íáõÙ ĸñ İ³ë³İ³Ý Ñ³Ù³İ³ñ·áõÙ
- XX 13ñ (1951 Æ.) –  
¾ÐØ EDVAC – ÑÇβáÕáõÃÛáõÝÁ` 1024 µ³é, ³Ù»Ý µ³éÁ` 44  
»ñİáõ³İ³Ý İ³ñ·
- Ù³Ã»Ù³İÇİáë æáÝ ýáÝ Û»ÛÙ³Ý

# ¾É»İñáÝ³ÛÇÝ Ñ³βíÇã Ù»ù»Ý³Ý»ñÇ å³İÙáõÃÛáõÝÇó

- 1-ÇÝ ë»ñáõÝ¹ (1945 – 1954 ã.ã.) –  
ÑÇÙÝ³İ³Ý İ³ññ»ñÝ »Ý É³Ùå»ñÁ, ÑÇβáÕáõÃÛáõÝÁ`  
Ñ³å³ÕÙ³Ý ·Í»ñ; Ù»ù»Ý³Û³İ³Ý É»½áõ »õ ³ë»ÙµÉ»ñ
- 2-ñ¹ ë»ñáõÝ¹ (1955 – 1964 ã.ã.) –  
ÑÇÙÝ³İ³Ý İ³ññ»ñÝ »Ý İÇë³Ñ³Õáñ¹ÇãÝ»ñÁ,  
ÑÇβáÕáõÃÛáõÝÁ` Ù³·ÝÇë³İ³Ý (ý»éÇİ³ÛÇÝ) ÙÇçáõİÝ»ñ;  
Algol, FORTRAN, COBOL; ûå»ñ³óÇáÝ Ñ³Û³İ³ñ·
- 3-ñ¹ ë»ñáõÝ¹ (1965 – 1970 ã.ã.) –  
ÑÇÙÝ³İ³Ý İ³ññ»ñÝ »Ý ÇÝİ»·ñ³É³ÛÇÝ ëË»Ù³Ý»ñÁ (Æê),  
¾ÐØ-Ý»ñÇ ÁÝİ³ÝÇù` IBM System 360

# ¾É»İĩñáÝ³ÛÇÝ Ñ³βíÇã Û»ù»Ý³Ý»ñÇ å³İÛáõÃÛáõÝÇó

- 4-ñ¹ ë»ñáõÝ¹ (1970 – 1984 ã.ã.) –  
ÑÇÛÝ³İ³Ý İ³ññ»ñÝ »Ý Û»Í »õ ·»ñÛ»Í ÇÝİ»·ñ³É³ÛÇÝ ëË»  
Û³Ý»ñÁ (ØÆê, ¶ØÆê)
- 5-ñ¹ ë»ñáõÝ¹ (1974 – \*\*\* ã.ã.) –  
ÛÇİĩñáåñáó»ëáñ³ÛÇÝ`  
1970-³İ³ÝÝ»ñÇ ëİÇ½µ` i4004 – 4 İ³ñ·, 4 ãÍ. ·áñÍ.  
1974 ã. ` i8080 – 8 İ³ñ·  
1976 ã. ` i8086/8088 – 16 İ³ñ·, ·İ³É³ñÁ` 20 İ³ñ·,  
ÑÇβáÕáõÃÛáõÝÁ` ÛÇÝã»õ 1 Mbyte

# ¾É»İĩñáÝ³ÛÇÝ Ñ³ßíÇã Û»ù»Ý³Ý»ñÇ å³İÛáõÃÛáõÝÇó

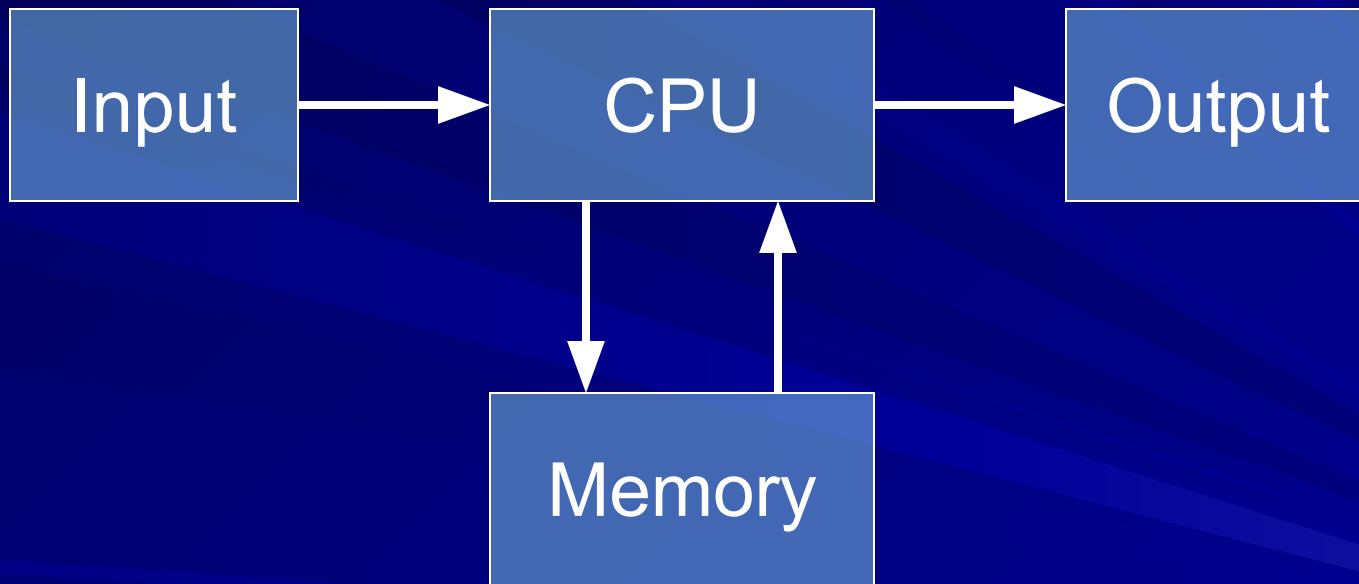
- 4-ñ¹ ë»ñáõÝ¹ (1970 – 1984 ã.ã.) –  
ÑÇÛÝ³İ³Ý İ³ññ»ñÝ »Ý Û»Í »õ ·»ñÛ»Í ÇÝİ»·ñ³É³ÛÇÝ ëË»  
Û³Ý»ñÁ (ØÆê, ¶ØÆê)
- 5-ñ¹ ë»ñáõÝ¹ (1974 – \*\*\* ã.ã.) –  
ÛÇİĩñáåñáó»ëáñ³ÛÇÝ`  
1982 ã. ` i80286 – i8086 – Ç µ³ñ»É³íí İ³ñµ»ñ³İ. ·İ³É³ñÁ`  
24 İ³ñ·, ÑÇßáÕáõÃÛáõÝÁ` ÛÇÝã»õ 16 Mbyte,  
·áñÍ»É³İ³ñ· Çñ³İ³Ý »õ å³ßİå³Ýíí  
1985 ã. ` i80386 İ³Û i386 - 32 İ³ñ·, ûå»ñ³İÇí  
ÑÇßáÕáõÃÛ³Ý ĸÇ³ÛÇÝ İ³½Û³İ»ñåáõÛ, ÛÇÝã»õ 4 Gbyte,  
»ñ»õ³İ³Û³İ³Ý i8086, İáÝí»Û»ñ



# ¾É»İĩñáÝ³ÛÇÝ Ñ³ßíÇã Û»ù»Ý³Ý»ñÇ å³İÛáõÃÛáõÝÇó

- 4-ñ¹ ë»ñáõÝ¹ (1970 – 1984 ã.ã.) –  
ÑÇÛÝ³İ³Ý İ³ññ»ñÝ »Ý Û»Í »õ ·»ñÛ»Í ÇÝİ»·ñ³É³ÛÇÝ ëË»  
Û³Ý»ñÁ (ØÆê, ¶ØÆê)
- 5-ñ¹ ë»ñáõÝ¹ (1974 – \*\*\* ã.ã.) –  
ÛÇİĩñáåñáó»ëáñ³ÛÇÝ`  
1989 ã. ` i486DX – İñ³Ý½ÇëİáñÝ»ñÇ ù³Ý³İÁ` 1.2 ÛÉÝ,  
Ý»ñ¹ñíÍ Û³Ã»Û³İÇİ³İ³Ý İáåñáó»ëáñ  
1993 ã. ` Pentium (i586), İñ³Ý½ÇëİáñÝ»ñÇ ù³Ý³İÁ` 3.1  
ÛÉÝ, »ñİáõ İáÝÍ»Û»ñ  
1997 ã. Û³ÛÇë` Pentium II; 1999 ã. ` Pentium III;  
2000 ã. í»ñÇ` Pentium IV

σάÙ÷Ûάõï»ñÇ ÁÝ¹Ñ³Ýάõñ Ì³έαõóί³ÍùÁ



²é³ççÝ ë»ñáõÝ¹Ý»ñç Ù»ù»Ý³Ý»ñ

- Đñ³Ù³Ýç ï»ëùÁ`

Đ Í	I Ñ³ëó»	II Ñ³ëó»	III Ñ³ëó»
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Đ Í	I Ñ³ëó»	II Ñ³ëó»
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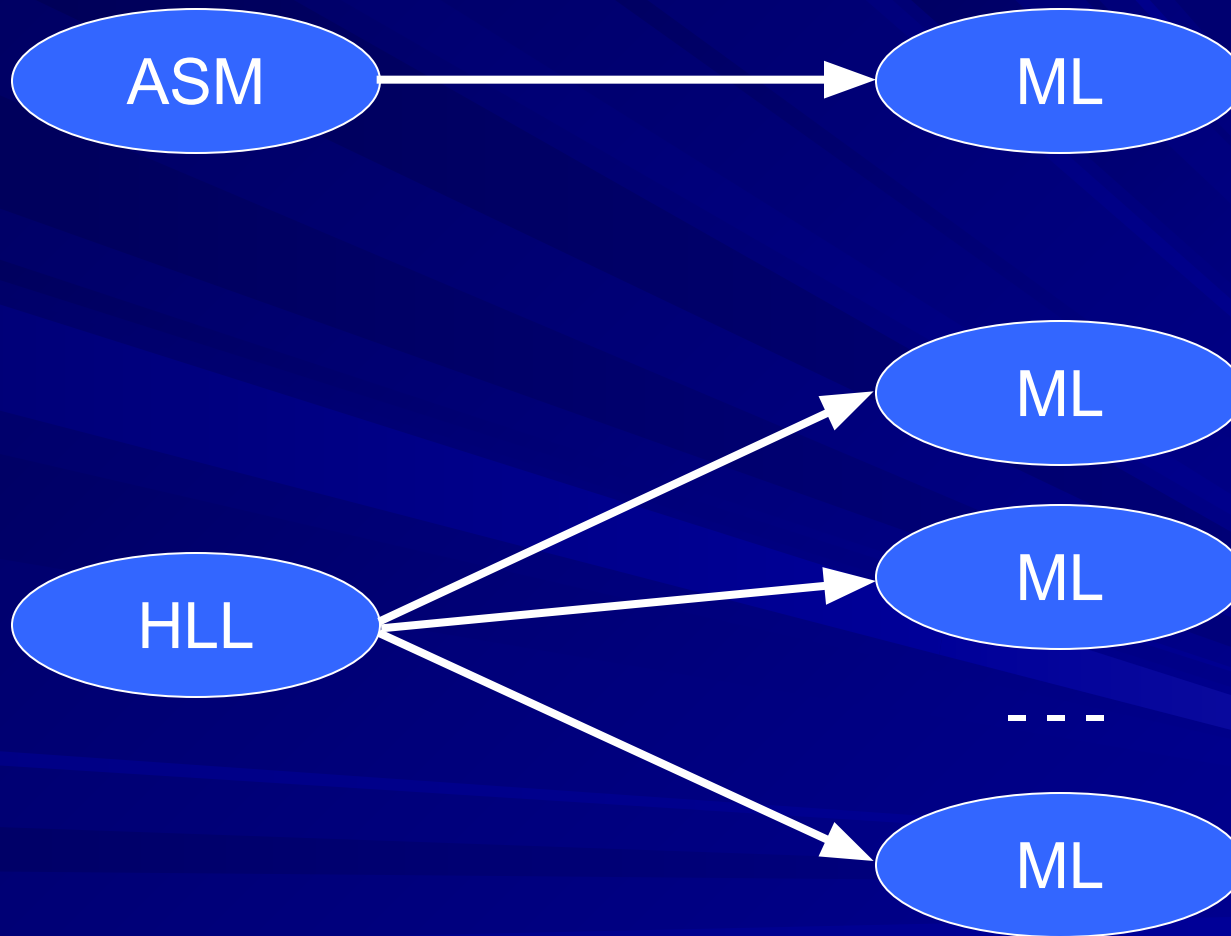
Đ Í	Ñ³ëó»
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# ²ë»ÙµÉ»ñ É»½áõ (Ý»ñ³íaõÃÛáõÝ)

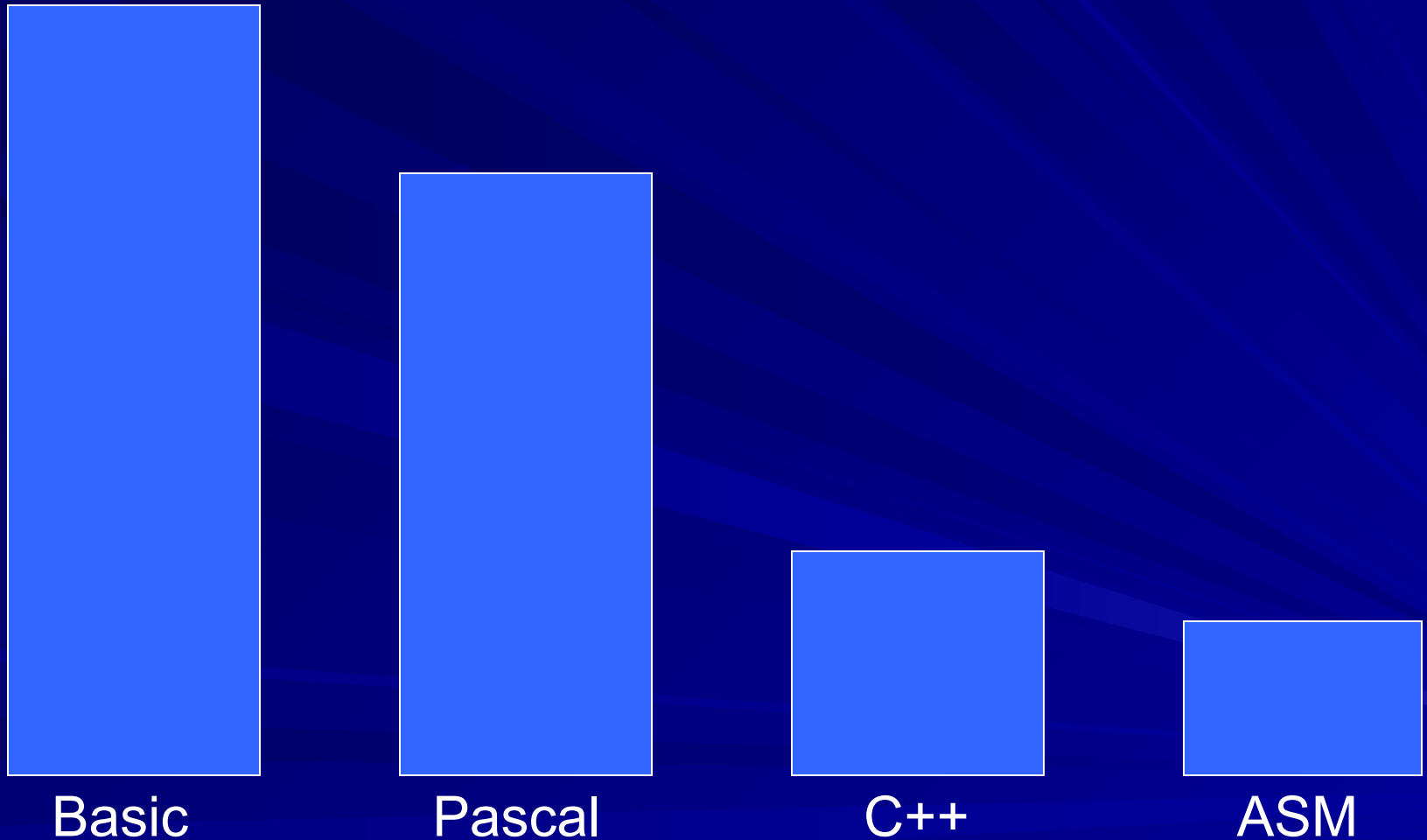
Ìñ³·ñ³ÛÇÝ ³ã³ÑáíÛ³Ý ëíáñ³í³ñ·áõÃÛ³Ý Û³í³ñ¹³íÝ»ñ

Ø³í³ñ¹³í	Ûí³ñ³·ñáõÃÛáõÝ
ÎÇñ³é³í³Ý Íñ³·Çñ	Ìñ³·ñ»ñ, Ûß³íí³ Û³ëÝ³íañ ¹³ëÇ ÈÝ¹ÇñÝ»ñÇ Ñ³Û³ñ:
³ñÓñ Û³í³ñ¹³íÇ É»½áõ (HLL)	Ìñ³·ñ»ñÃ Ã³ñ·Û³ÝíaõÙ »Ý í³Ù ³ë»ÙµÉ»ñ, í³Ù Û»ù»Ý³Û³í³Ý É» ½íÇ: ²Û»Ý ÛÇ ûå»ñ³íañ, ÇÝãå»ë ûñ»Ýù, Û»ù»Ý³Û³í³Ý É» ½íaí ³ñ³ã³í»ñíaõÙ ; µ³½Û³ù³Ý³í Ññ³Û³ÝÝ»ñái: (C++, Pascal, Java, . . .)
úå»ñ³óÇáÝ Ñ³Û³í³ñ·	ã³ñáõÝ³íaõÙ ; ýáõÝíóÇ³Ý»ñ, áñáÝù í³ñáÕ »Ý í³Ýái»É Íñ³·ñ» ñÇó, ·ñí³í µ³ñÓñ Û³í³ñ¹³íÇ É»½íaí í³Ù ³ë»ÙµÉ»ñái: Í³ñáÕ ; ã³ñáõÝ³í»É Ý³»õ ÎÇñ³é³í³Ý Íñ³·ñ³íañÛ³Ý ÇÝí»ñý»Ûë (API):
²ë»ÙµÉ»ñ É» ½áõ (ASM)	ú·í³·áñíaõÙ »Ý ëÇÛíaÉ³ÛÇÝ Ññ³Û³ÝÝ»ñ, áñáÝù Û»íÁ Û» íÇÝ ³ñ³Ñ³ÛííaõÙ »Ý Û»ù»Ý³Û³í³Ý É»½íaí:
Ø»ù»Ý³Û³í³Ý É»½áõ (ML)	Ãí³ÛÇÝ Ññ³Û³ÝÝ»ñ »õ ûå»ñ³Ý¹Ý»ñ, áñáÝù í³ñáÕ »Ý ã³Ñã³Ýí»É ÑÇßáÕáõÃÛáõÝáõÙ »õ áõÕ³íÇáñ»Ý í³í³ñí»É áñáó»ëáñÇ íáÕÛÇó:

²ë»ÙμÉ»ñ É»½áõ (Ý»ñ³íaõÃÛáõÝ)



²ë»ÙμÉ»ñ É»½áõ (Ý»ñ³íaõÃÛáõÝ)



2ë»ÙμÉ»ñ É»½áõ (Ý»ñ³íaõÃÛáõÝ)

Ðñ³Û³ÝÝ»ñ

Ø»ù»Ý³Û³İ³Ý

01001001  
49

2ë»ÙμÉ»ñ

DEC CX

10110100 00001001  
B4 09

MOV AH, 9

11000111 00000110 00000000 00000010 11111111 11111111  
C7 06 00 00 FF FF

MOV Step, -1

²ë»ÙμÉ»ñ É»½áõ (Ý»ñ³íaõÃÛáõÝ)

îÛ³ÉÝ»ñ

³ÛÃ (byte)



ÇÃ»ñÇ Ñ³Û³ñÝ»ñÁ 7 6 5 4 3 2 1 0

³é (word)

2-byte (16 bit)

- Û»Ï îÛ³É

ÎñÏÝ³ÏÇ μ³é (doubleword)

4-byte (32 bit)

- Û»Ï îÛ³É

ø³é³ÏÇ μ³é (quadword)

8-byte (64 bit)

- Û»Ï îÛ³É

ä³ñ³·ñ³ý (paragraph)

16-byte (128 bit)

- îÛ³ÉÝ»ñÇ

¹³βï

Kilobyte, Megabyte »õ ³ÛÉÝ



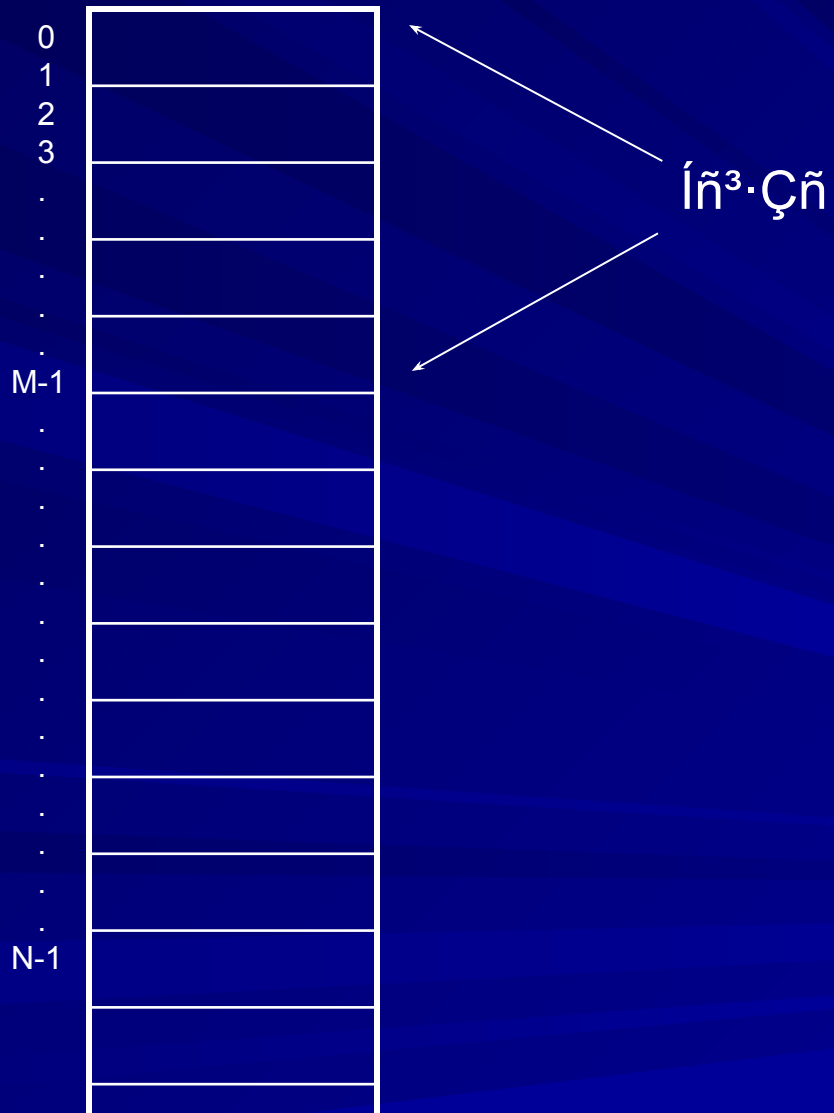
²ë»ÛμÉ»ñ É»½áõ (Ý»ñ³íaõÃÛáõÝ)

Đñ³Û³ÝÇ İ³İñÛ³Ý ÷áõÉ»ñ, İáÝí»Û»ñ

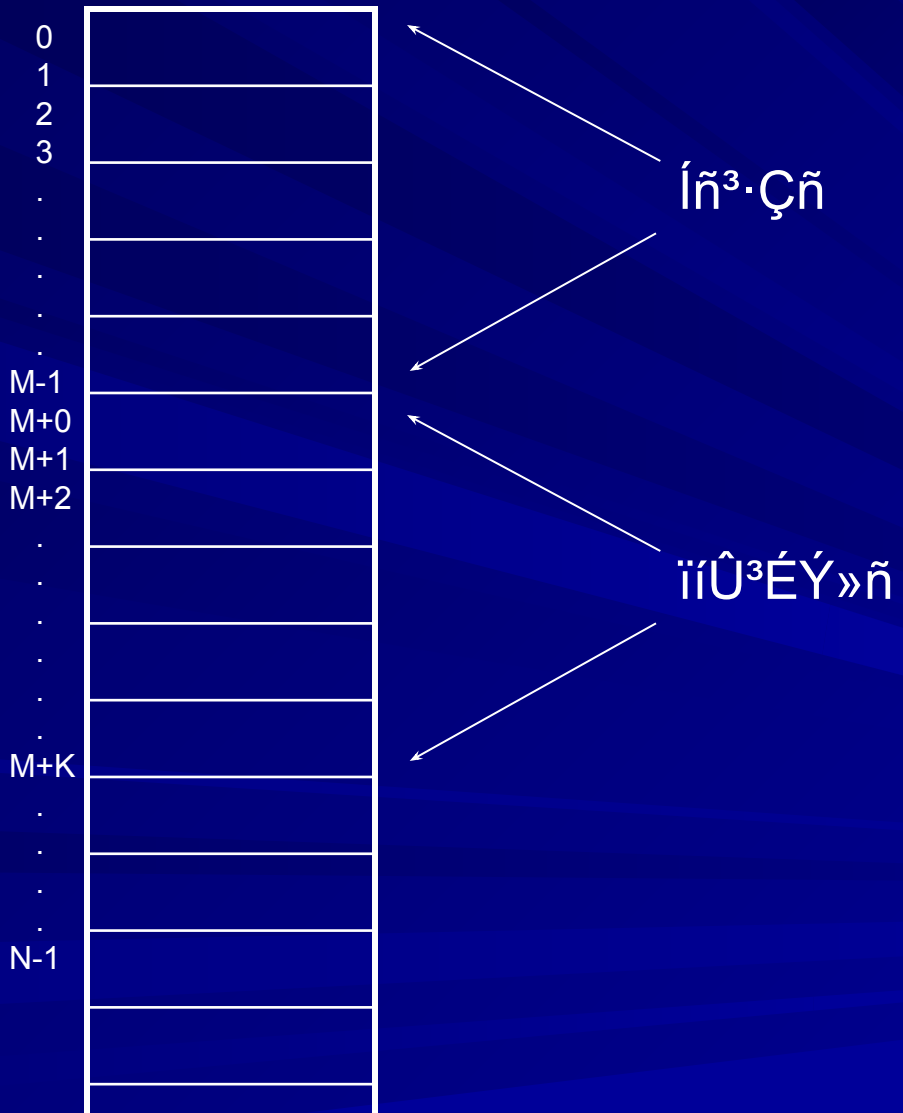
1. Ññ³Û³ÝÇ ÁÝiñáõÛ ù»ß İ³Û ûå»ñ³iÇí ÑÇßáÕáõÃÛáõÝÇó
2. Ññ³Û³ÝÇ í»ñí³ÝáõÛ
3. ûå»ñ³Ý¹Ý»ñÇ Ñ³ëó»Ý»ñÇ áñáßáõÛ (İ³½Û³íañáõÛ)
4. ·áñíaÕáõÃÛ³Ý İ³İñáõÛ
5. ³ñ¹ÛáõÝùÇ ·ñ³ÝóáõÛ



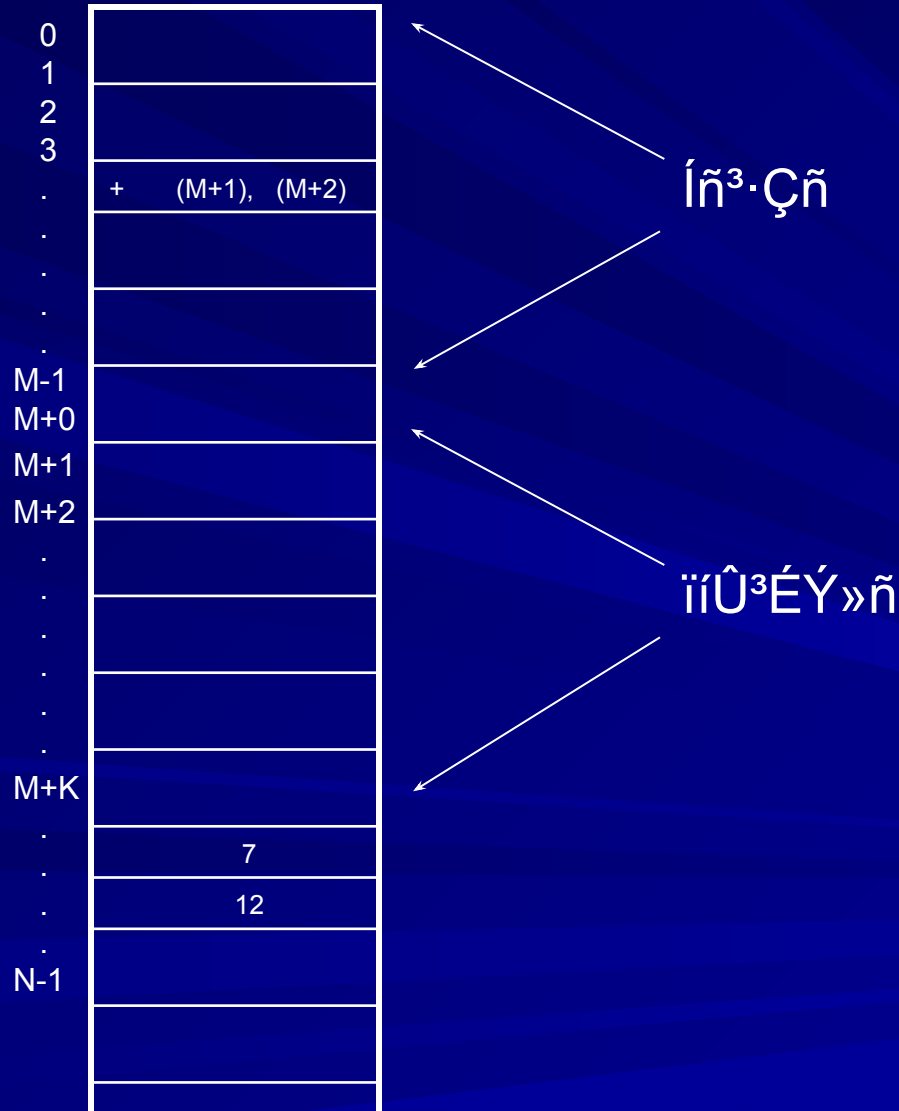
ê»·Ù»ÝİÝ»ñ »õ Ñ³ëó»³íañaõÙ



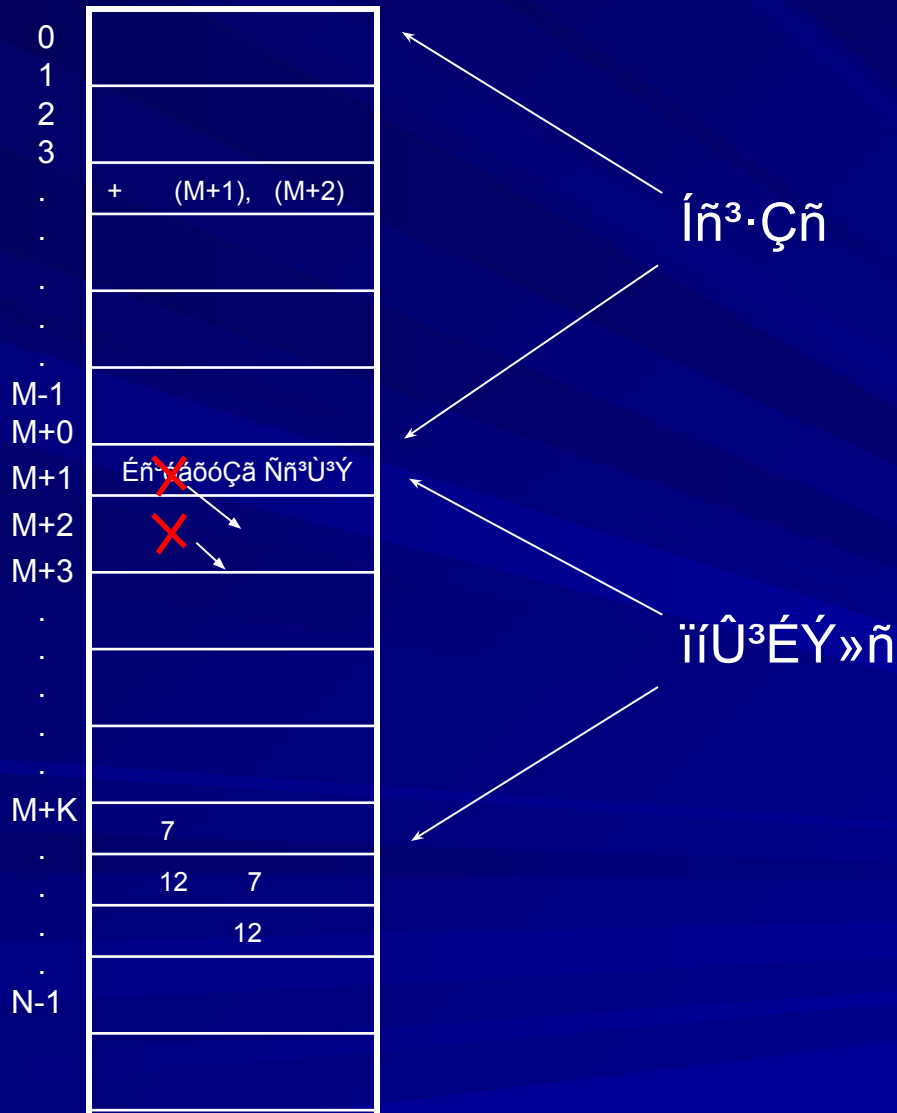
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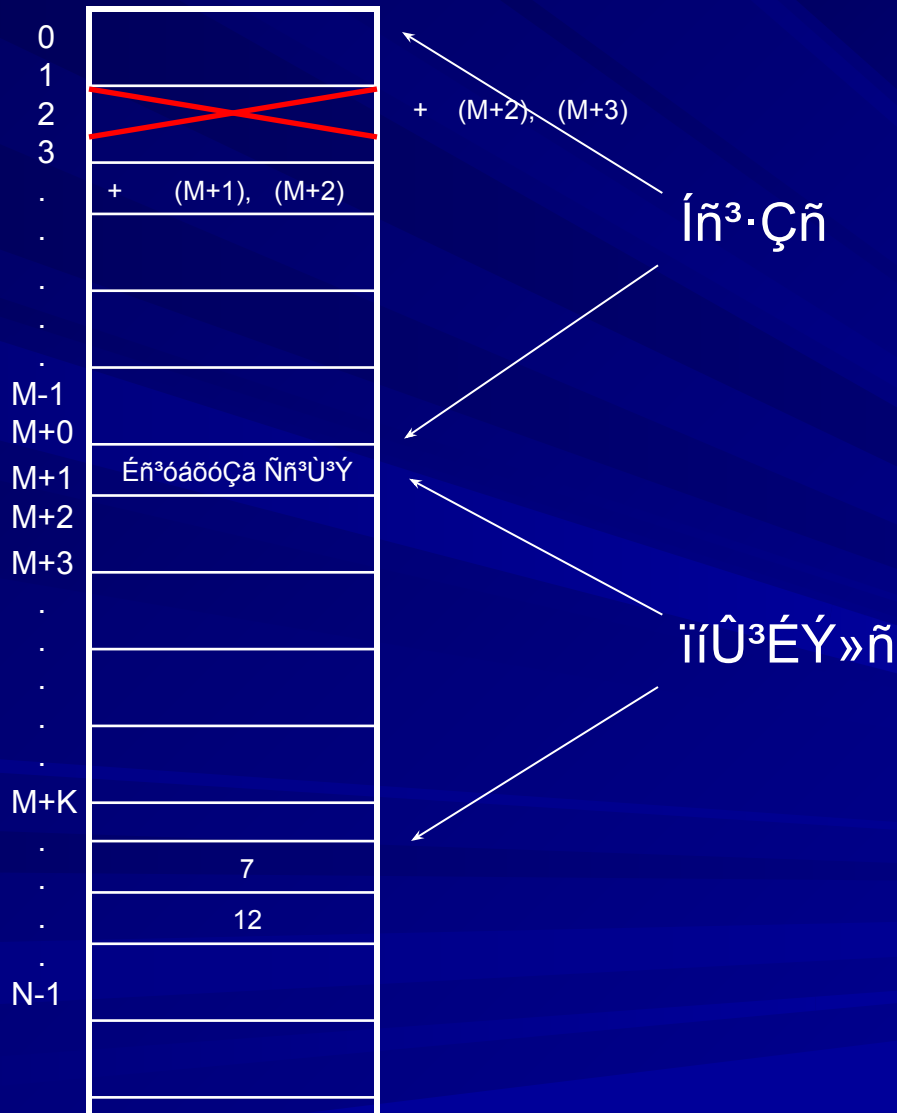
ê»·Ù»ÝïÝ»ñ »õ Ñ³ëó»³íañaõÙ



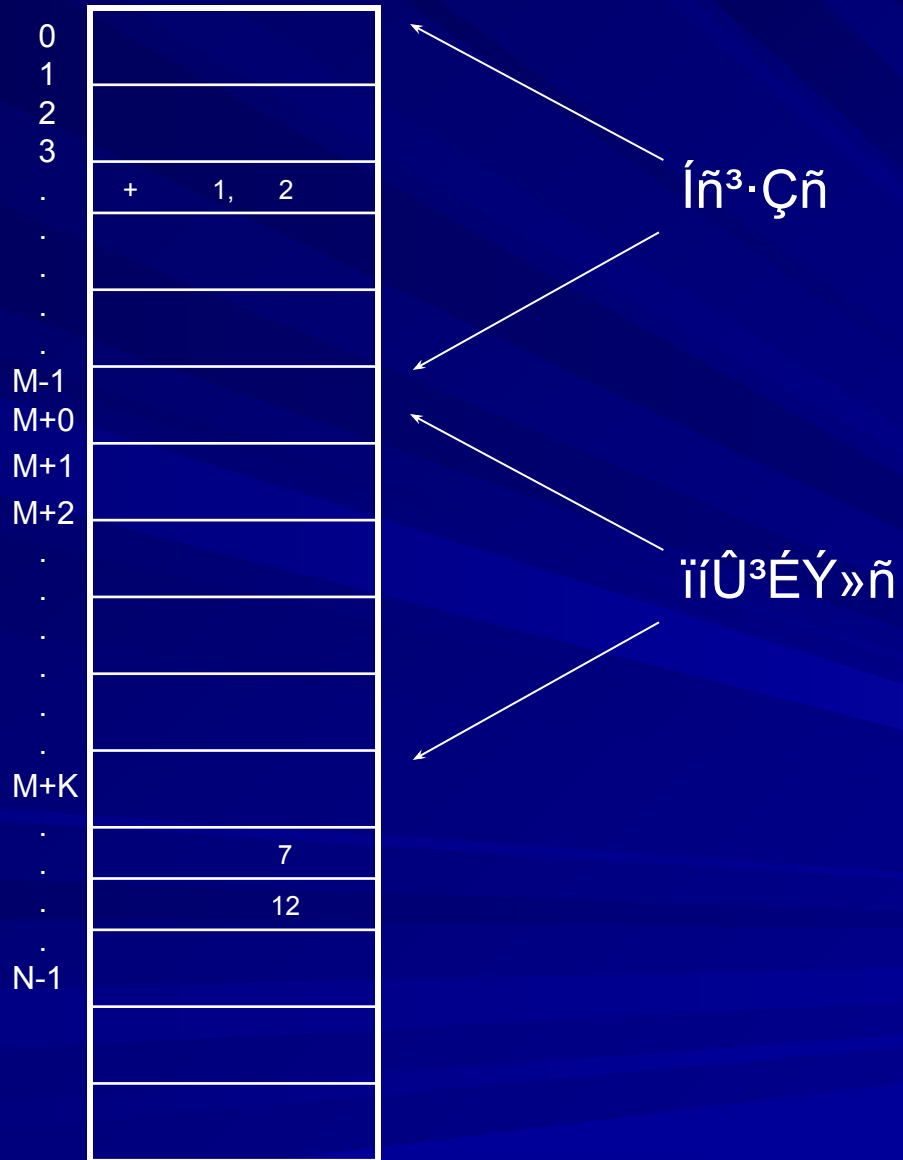
# ê»·Ù»ÝİÝ»ñ »õ Ñ³ëó»³íañaõÙ



# ê»·Ù»ÝİÝ»ñ »õ Ñ³ëó»³íañaõÙ

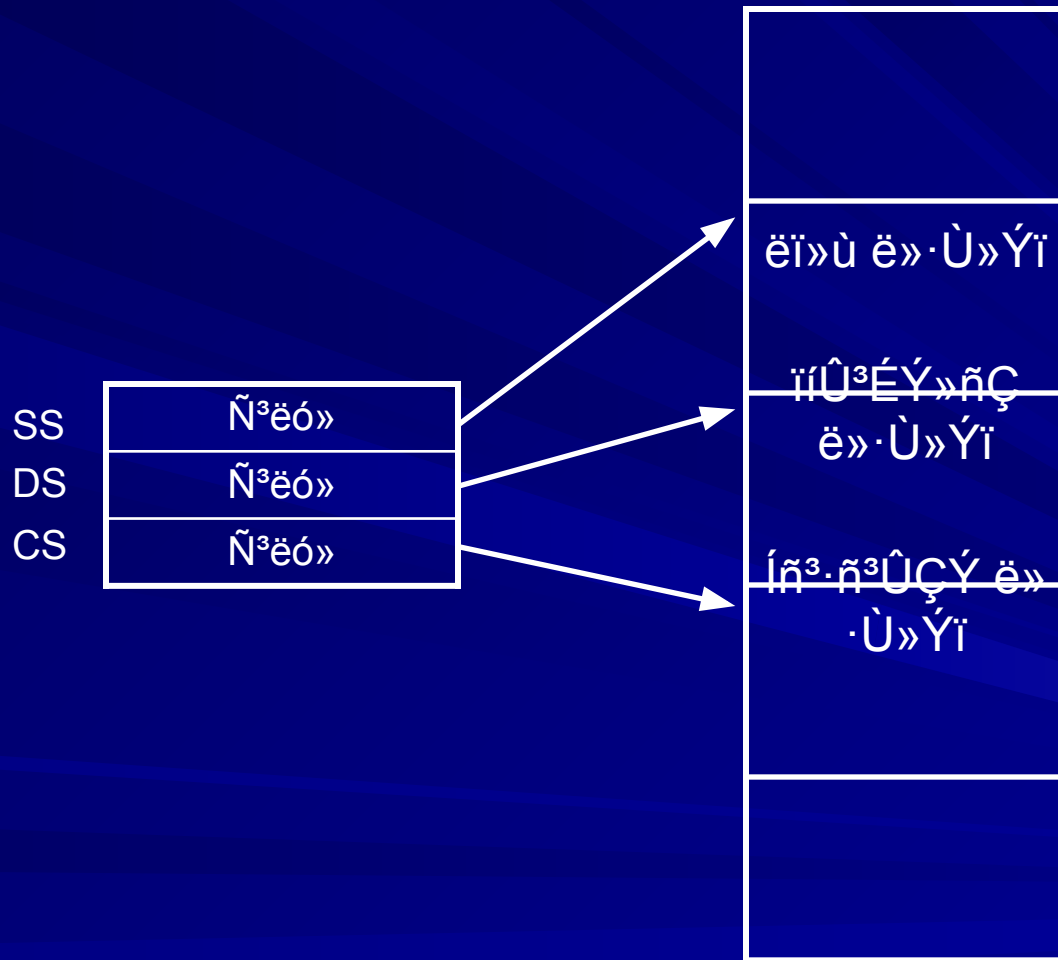


ê»·Ù»ÝÏÝ»ñ »õ Ñ³ëó»³íañaõÙ

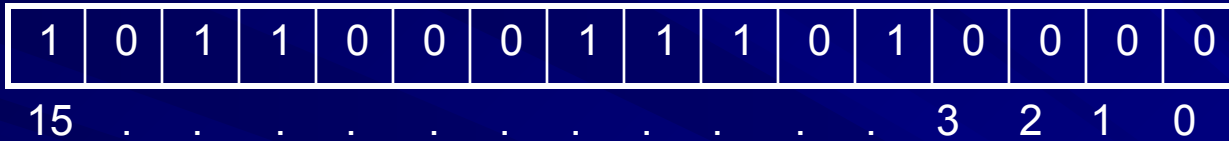




ê»·Ù»ÝİÝ»ñ  
 »õ ë»·Ù»Ýİ³ÛÇÝ é»·ÇëïñÝ»ñ

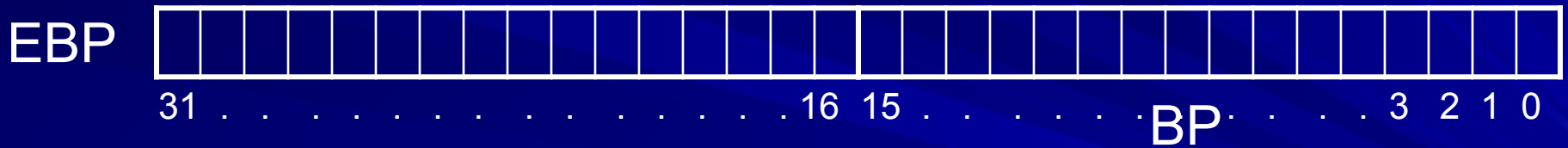
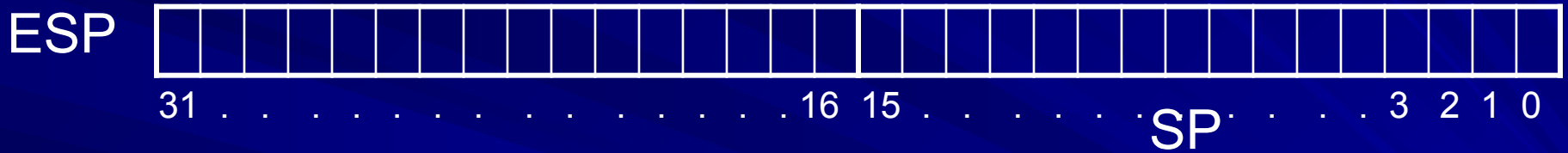
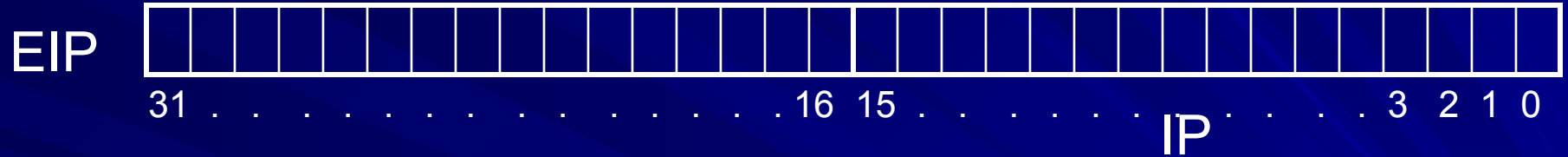


ê»·Ù»ÝİÝ»ñ  
 »õ ë»·Ù»Ýİ³ÛÇÝ é»·ÇëïñÝ»ñ



0 – Çó ÛÇÝã»õ  $2^{16} - 1$  İ³Û 0 – Çó ÛÇÝã»õ 65  
 535

òáõóÇã é»·ÇëïñÝ»ñ



ÆÝ¹»ùë³ÛÇÝ é»·ÇëïñÝ»ñ



# ÀÝ¹Ñ³Ýáõñ Ýà³ĩ³ÛÇÝ û·ĩ³·áñÛ³Ý é»·ÇëĩñÝ»ñ

## AX



## BX



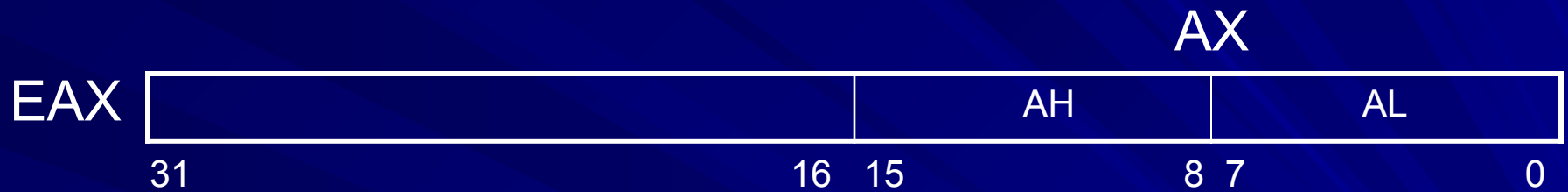
## CX



## DX



ÀÝ¹Ñ³Ýáõñ Ýà³ĩ³ĩ³ÛÇÝ û·ĩ³·áñÍÛ³Ý é»·ÇëĩñÝ»ñ



```
MOV    AH, 1
MOV    AL, 1
      AX - ?
```

äñáó»ëáñÇ íÇ×³İÇ »õ Õ»İ³íñÙ³Ý é»·Çëiñ  
(¹ñáßÝ»ñÇ é»·Çëiñ)

Flags

EFlags



31 . . . . . 16 15 . . . 11 10 9 8 7 6 5 4 3 2 1 0





