

Ð³Ù³Ï³Ñ·³ÛÇÝ ÍÑ³·Ñ³ÍÁÑÁÐÙ

¹áó. èáµ»ñí ¶ñÇ·áñÇ Ð³ÏáµÛ³Ý

Ù³ëÝ |

Ð³Ù³Í³ñ·³ÛÇÝ Íñ³·ñ³íáñáõÙ

¶ñ³Í³ÝáõÃÛáõÝ

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.

Ð³Ù³Í³ñ·³ÛÇÝ Íñ³·ñ³íáñáõÙ

¶ñ³Í³ÝáõÃÛáõÝ

1. А. Þðîâ. Assembler. У÷åáíèê для ВУЗ-ов. Èçä. 2-îå, Íèòåð, Ñ.-Íåòåðáóðã, 2006, 637 ñòð.
2. А. Þðîâ. Assembler (ïðàêòèêóì). Èçä. 2-îå, Íèòåð, Ñ.-Íåòåðáóðã, 2002, 395 ñòð.
3. Ñ. Çóáêîâ. Assembler äëÿ DOS, Windows è UNIX. Èçä. ÄÌÊ, Ìîñêâà, 2000, 608 ñòð.

¾É»ïiñáÝ³ÛÇÝ Ñ³ßíÇã Ù»ù»Ý³Ý»ñÇ å³iÙáõÃÛáõÝÇó

- XVII ¹³ñ (1623 Ä.) –
·ÇiÝ³i³Ý i.ÞÇi³ñ¹Ç ·áõÙ³ñáÖ-Ñ³ÝáÖ Ù»ù»Ý³
- XVII ¹³ñ (1671 Ä.) –
÷ÇÉÇëá÷³ »õ Ù³Ä»Ù³iÇláë ¶. È»ÛµÝÇóÇ Ñ³ßí³Ù»ù»Ý³
- XIX ¹³ñ (1842 Ä.) –
·ÇiÝ³i³Ý »õ ÷ÇÉÇëá÷³ . ä³ëi³ÉÇ Ñ³ßí³Ù»ù»Ý³
- XIX ¹³ñ (1823 - 1853 Ä.Ä.) –
Ù³Ä»Ù³iÇláë â. '»µµÇçÇ ·³Ö³÷³ñÝ»ñ

¾É»ïiñáÝ³ÛÇÝ Ñ³ÞíÇã Ù»ù»Ý³Ý»ñÇ å³iÙáõÃÛáõÝÇó

- XX ¹³ñ (1946 Ä.) – ²ØÜ, ö»ÝëÇÉí³ÝÇ³, ³é³çÇÝ áõÝÇí» ñë³É ^¾ÐØ ENIAC – 18 Ñ³¹/₂³ñ É³Ùå, ù³ÞÁ` 30 i., $\frac{1}{2}\mu^3$ Ö. Ù³Í»ñ»ë` 200 ù.Ù. ²ÞË³iáõÙ ¿ñ i³ë³Í³Ý Ñ³Ù³Í³ñ·áõÙ
- XX ¹³ñ (1951 Ä.) – ^¾ÐØ EDVAC – ÑÇÞáõÃÛáõÝÁ` 1024 μ^3 é, ³Ù»Ý μ^3 éÁ` 44 »ñláõ³Í³Ý Í³ñ·
- Ù³Ã»Ù³iÇláë æáÝ ýáÝ Ü»ÛÙ³Ý

¾É»ïiñáÝ³ÛÇÝ Ñ³ÞíÇã Ù»ù»Ý³Ý»ñÇ å³iÙáõÃÛáõÝÇó

- 1-ÇÝ ë»ñáõÝ¹ (1945 – 1954 Å.Å.) –
ÑÇÙÝ³Ý³Ý i³ññ»ñÝ »Ý É³Ùå»ñÁ, ÑÇÞáÕáõÃÛáõÝÁ`
Ñ³å³ÕÙ³Ý ·í»ñ; Ù»ù»Ý³Û³Ý³Ý É»½áõ »õ ³ë»ÙµÉ»ñ
- 2-ñ¹ ë»ñáõÝ¹ (1955 – 1964 Å.Å.) –
ÑÇÙÝ³Ý³Ý i³ññ»ñÝ »Ý ïÇë³Ñ³Õáñ¹ÇãÝ»ñÁ,
ÑÇÞáÕáõÃÛáõÝÁ` Ù³·ÝÇë³Ý³Ý (ý»éÇi³ÛÇÝ) ÙÇçáõÝ»ñ;
Algol, FORTRAN, COBOL; ûå»ñ³óÇáÝ Ñ³Ù³Ý³ñ·
- 3-ñ¹ ë»ñáõÝ¹ (1965 – 1970 Å.Å.) –
ÑÇÙÝ³Ý³Ý i³ññ»ñÝ »Ý ÇÝi»·ñ³É³ÛÇÝ ëË»Ù³Ý»ñÁ (Æê),
¾ÐØ-Ý»ñÇ ÁÝi³ÝÇù` IBM System 360

¾É»ïiñáÝ³ÛÇÝ Ñ³ÞíÇã Ù»ù»Ý³Ý»ñÇ å³iÙáõÃÛáõÝÇó

- 4-ñ¹ ë»ñáõÝ¹ (1970 – 1984 Å.Å.) –
ÑÇÙÝ³Ý³Ý »ññ»ñÝ »Ý Ù»Í »õ ·»ñÙ»Í ÇÝi»·ñ³É³ÛÇÝ ëE»Ù³Ý»ñÁ (ØÆê, ¶ØÆê)
- 5-ñ¹ ë»ñáõÝ¹ (1974 – *** Å.Å.) –
ÙÇIñáåñáó»ëáñ³ÛÇÝ
1970-³ÝÝ»ñÇ ëÍÇ½µ` i4004 – 4 Í³ñ·, 4 Åí. ·áñÍ.
1974 Å.` i8080 – 8 Í³ñ·
1976 Å.` i8086/8088 – 16 Í³ñ·, ·í³É³ñÁ` 20 Í³ñ·,
ÑÇÞáÖáõÃÛáõÝÁ` ÙÇÝä»õ 1 Mbyte

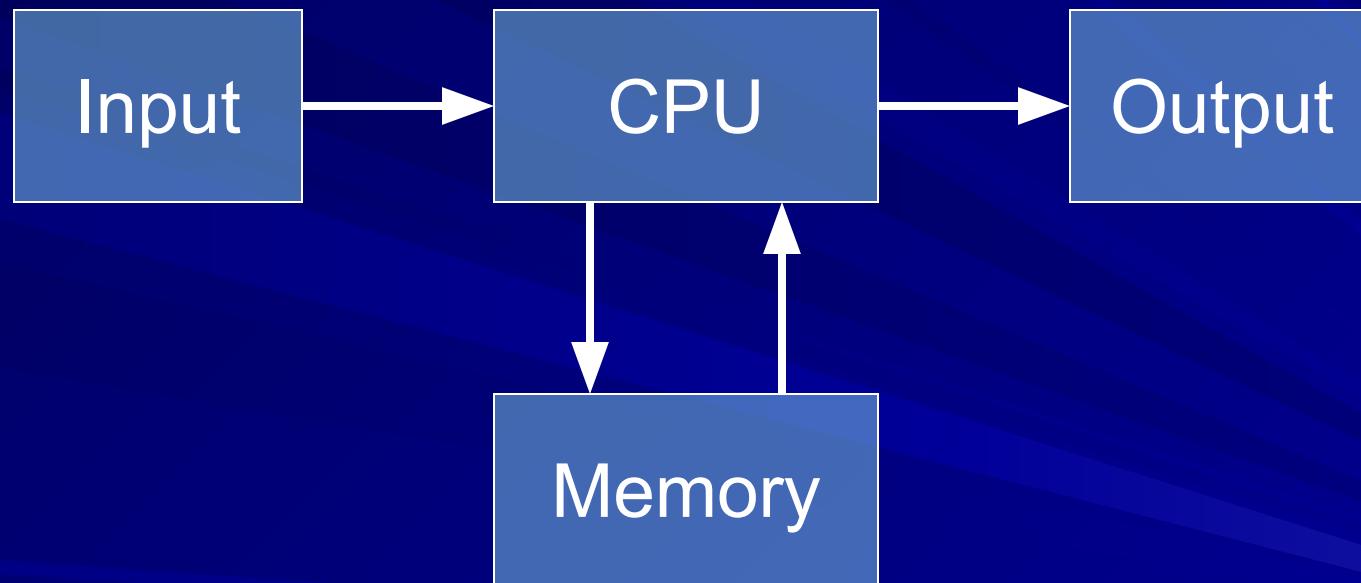
¾É»ÏÍñáÝ³ÛÇÝ Ñ³ÞÍÇã Ù»ù»Ý³Ý»ñÇ å³ïÙáõÃÛáõÝÇó

- 4-ñ¹ ë»ñáõÝ¹ (1970 – 1984 Å.Å.) –
ÑÇÙÝ³Ý³Ý ï³ññ»ñÝ »Ý Ù»Í »õ ·»ñÙ»Í ÇÝí»·ñ³É³ÛÇÝ ëË»Ù³Ý»ñÁ (ØÆê, ¶ØÆê)
- 5-ñ¹ ë»ñáõÝ¹ (1974 – *** Å.Å.) –
ÙÇÍñáåñáó»ëáñ³ÛÇÝ
1982 Å. ` i80286 – i8086 – Ç µ³ñ»É³í³í i³ñµ»ñ³í. ·í³É³ñÁ`
24 ï³ñ·, ÑÇßáÖáõÃÛáõÝÁ`ÙÇÝä»õ 16 Mbyte,
·áñí»É³í³ñ·` Çñ³í³Ý »õ å³ßíå³Ýí³í
1985 Å. ` i80386 ï³Ù i386 - 32 ï³ñ·, ûå»ñ³íÇí
ÑÇßáÖáõÃÛ³Ý ¿ç³ÛÇÝ ï³½Ù³í»ñåáõÙ,ÙÇÝä»õ 4 Gbyte,
»ñ»õ³í³Û³Ý i8086, ÍáÝí»Û»ñ

¾É»ïiñáÝ³ÛÇÝ Ñ³ßíÇã Ù»ù»Ý³Ý»ñÇ å³iÙáõÃÛáõÝÇó

- 4-ñ¹ ë»ñáõÝ¹ (1970 – 1984 Å.Å.) –
ÑÇÙÝ³Ý³Ý i³ññ»ñÝ »Ý Ù»Í »õ ·»ñÙ»Í ÇÝi»·ñ³É³ÛÇÝ ëE»Ù³Ý»ñÁ (ØÆê, ¶ØÆê)
- 5-ñ¹ ë»ñáõÝ¹ (1974 – *** Å.Å.) –
ÙÇIñáåñáó»ëáñ³ÛÇÝ
1989 Å. ` i486DX – iñ³Ý½ÇëiáñÝ»ñÇ ù³Ý³iÁ` 1.2 ÙÉÝ,
Ý»ñ¹ñí³í Ù³Ã»Ù³iÇi³Ý ïáåñáó»ëáñ
1993 Å. ` Pentium (i586), iñ³Ý½ÇëiáñÝ»ñÇ ù³Ý³iÁ` 3.1
ÙÉÝ, »ñïáõ ïáÝí»Û»ñ
1997 Å. Ù³ÛÇë` Pentium II; 1999 Å. ` Pentium III;
2000 Å. í»ñç` Pentium IV

ØáÙ÷Ûáõï»ñÇ ÁÝ¹Ñ³Ýáõñ Í³éáõóí³ÍùÁ



²é³çÇÝ ë»ñáõÝ¹Ý»ñÇ Ù»ù»Ý³Ý»ñ

- Đñ³Ù³ÝÇ ï»ëùÁ`

Đ ĩ	I Ñ ³ ëó»	II Ñ ³ ëó»	III Ñ ³ ëó»
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Đ ĩ	I Ñ ³ ëó»	II Ñ ³ ëó»
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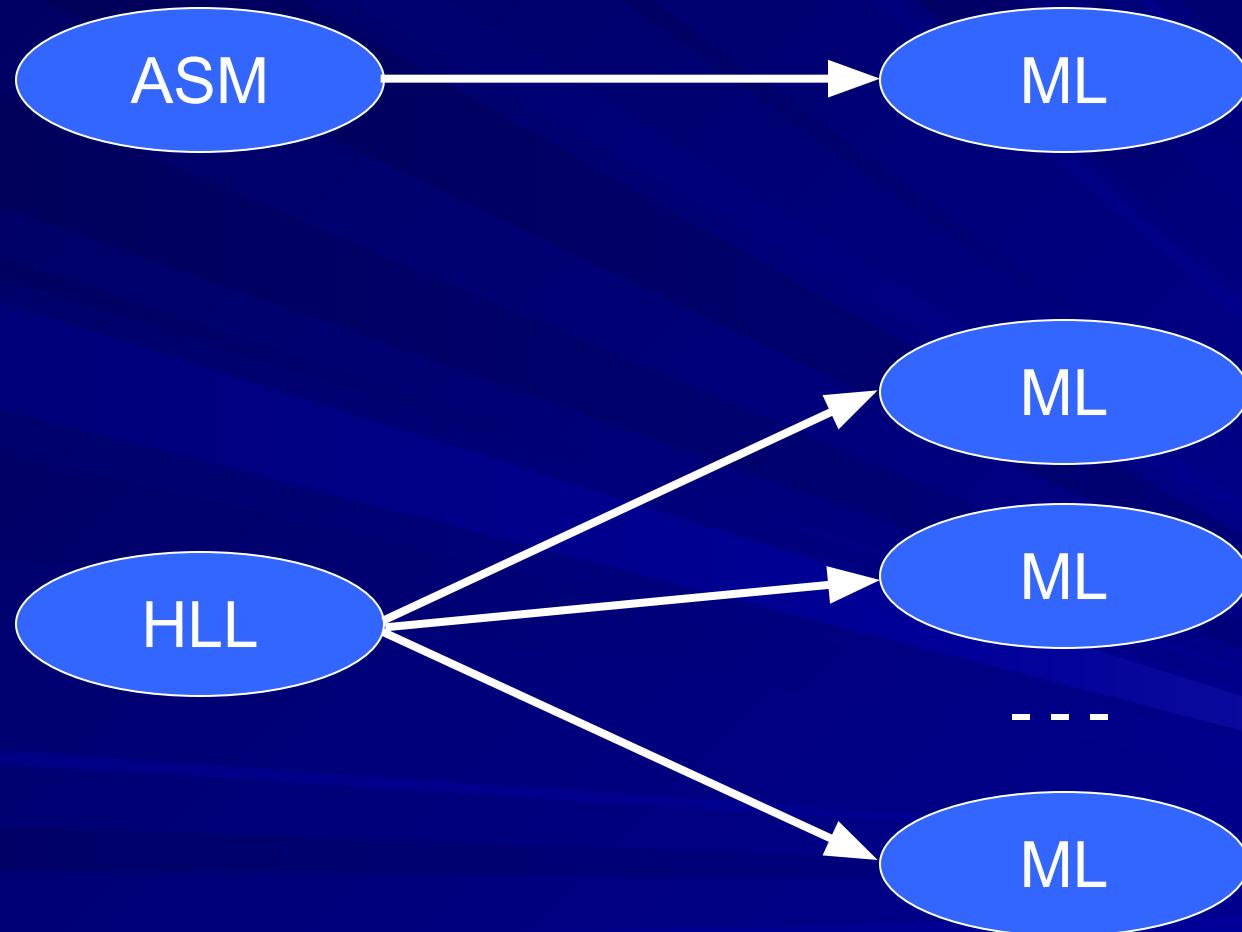
Đ ĩ	Ñ ³ ëó»
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²ë»ÙµÉ»ñ É»½áõ (Ý»ñ³ÍáõÃÛáõÝ)

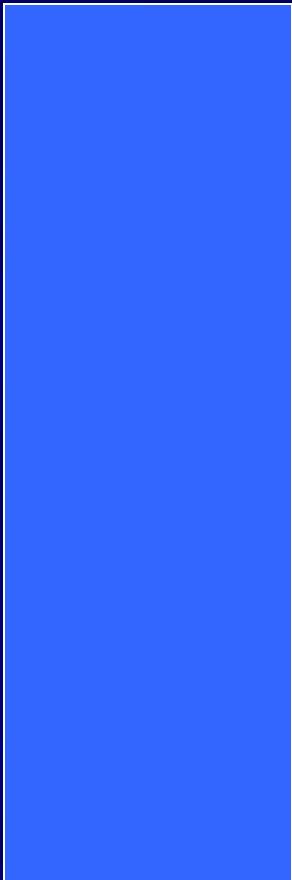
Ìñ³·ñ³ÛÇÝ ³å³ÑáíÙ³Ý ëíáññ³ñ·áõÃÛ³Ý Ù³ñ³ñ¹³Ý»ñ

Ø³ñ³ñ¹³ñ	Üñ³ñ³·ñáõÃÛáõÝ
ÍÇñ³é³ñ³Ý Íñ³·Çñ	Ìñ³·ñ»ñ, Ùß³ñ³í Ù³ëÝ³íáñ ¹³ëÇ ËÝ¹ÇñÝ»ñÇ Ñ³Ù³ñ:
’³ñÓñ Ù³ñ³ñ¹³ñÇ É»½áõ (HLL)	Ìñ³·ñ»ñÁ Ä³ñ·Ù³ÝíáõÙ »Ý ï³Ù ³ë»ÙµÉ»ñ, ï³Ù Ù»ù»Ý³Û³ñ³Ý É»½íÇ: ²Ù»Ý ÙÇ ûå»ñ³ñáñ, ÇÝåå»ë ûñ»Ýù, Ù»ù»Ý³Û³ñ³Ý É»½íáí ³ñ³å³ñ»ë»ñíáõÙ ɿ µ³½Ù³ù³Ý³Í Ññ³Ù³ÝÝ»ñáí: (C++, Pascal, Java, . . .)
úå»ñ³óÇáÝ Ñ³Ù³ñ³ñ·	ä³ñáõÝ³ñáõÙ ɿ ýáõÝíóÇ³Ý»ñ, áñáÝù ï³ñáÖ »Ý ï³Ýäí»É Íñ³·ñ»ñÇó, ·ñí³í µ³ñÓñ Ù³ñ³ñ¹³ñÇ É»½íáí ï³Ù ³ë»ÙµÉ»ñáí: ï³ñáÖ ɿ å³ñáõÝ³ñ»É Ý³»õ ÍÇñ³é³ñ³Ý Íñ³·ñ³íáñÙ³Ý ÇÝ»ñý»Ûë (API):
²ë»ÙµÉ»ñ É»½áõ (ASM)	ú·ñ³·áñííáõÙ »Ý ëÇÙíáÉ³ÛÇÝ Ññ³Ù³ÝÝ»ñ, áñáÝù Ù»ïÁ Ù»ïÇÝ ³ñí³ñ³ÛñíáõÙ »Ý Ù»ù»Ý³Û³ñ³Ý É»½íáí:
Ø»ù»Ý³Û³ñ³Ý É»½áõ (ML)	Âí³ÛÇÝ Ññ³Ù³ÝÝ»ñ »õ ûå»ñ³Ý¹Ý»ñ, áñáÝù ï³ñáÖ »Ý å³Ñå³Ý»É ÑÇßáÖáõÃÛáõÝáõÙ »õ áõÖÖ³ñ³ÍÇáñ»Ý ï³ñí»É åñáó»ëáñÇ ïáÖÙÇó:

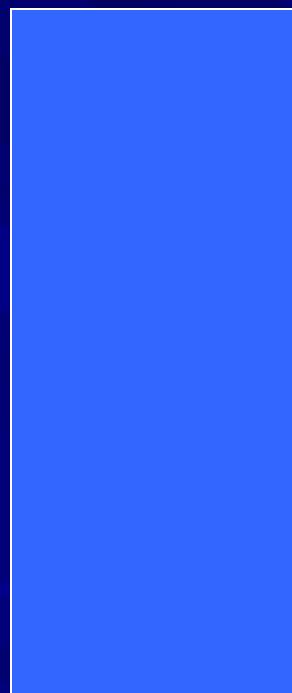
²ë»ÙµÉ»ñ É»½áõ (Ý»ñ³ÍáõÃÛáõÝ)



²ë»ÙµÉ»ñ É»½áõ (Ý»ñ³ÍáõÃÛáõÝ)



Basic



Pascal



C++



ASM

2ë»ÙµÉ»ñ É»½áõ (Ý»ñ³ÍáõÃÛáõÝ)

Ðñ³Ù³ÝÝ»ñ

Ø»ù»Ý³Û³Í³Ý

2ë»ÙµÉ»ñ

01001001
49

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»ñ³ÍáõÃÛáõÝ)

ííÛ³ÉÝ»ñ

³ÛÃ (byte)



Ç»ñÇ Ñ³Ù³ñÝ»ñÁ

³é (word)

2-byte (16 bit) - Ù»Í ííÛ³É

ÍñÍÝ³ÍÇ µ³é (doubleword) 4-byte (32 bit) - Ù»Í ííÛ³É

Ø³é³ÍÇ µ³é (quadword) 8-byte (64 bit) - Ù»Í ííÛ³É

ääñ³·ñ³ý (paragraph) 16-byte (128 bit) - ííÛ³ÉÝ»ñÇ
¹³ßí

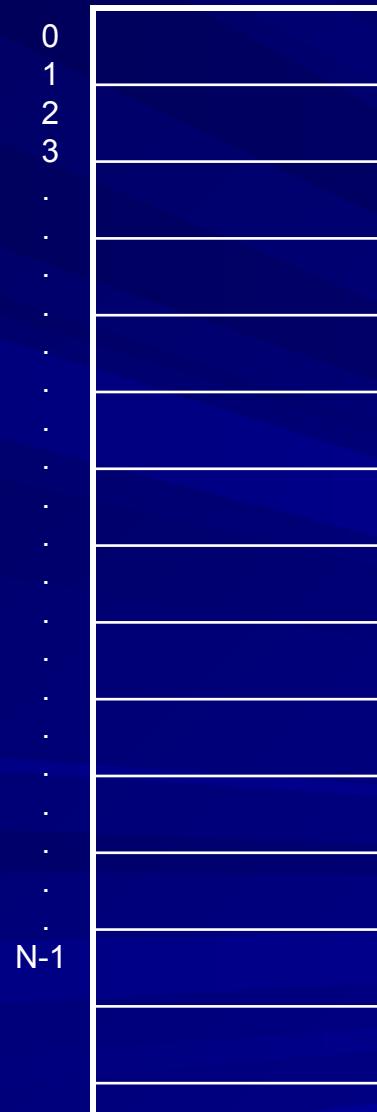
Kilobyte, Megabyte »õ ³ÛÉÝ

²ë»ÙµÉ»ñ É»½áõ (Ý»ñ³ÍáõÃÛáõÝ)

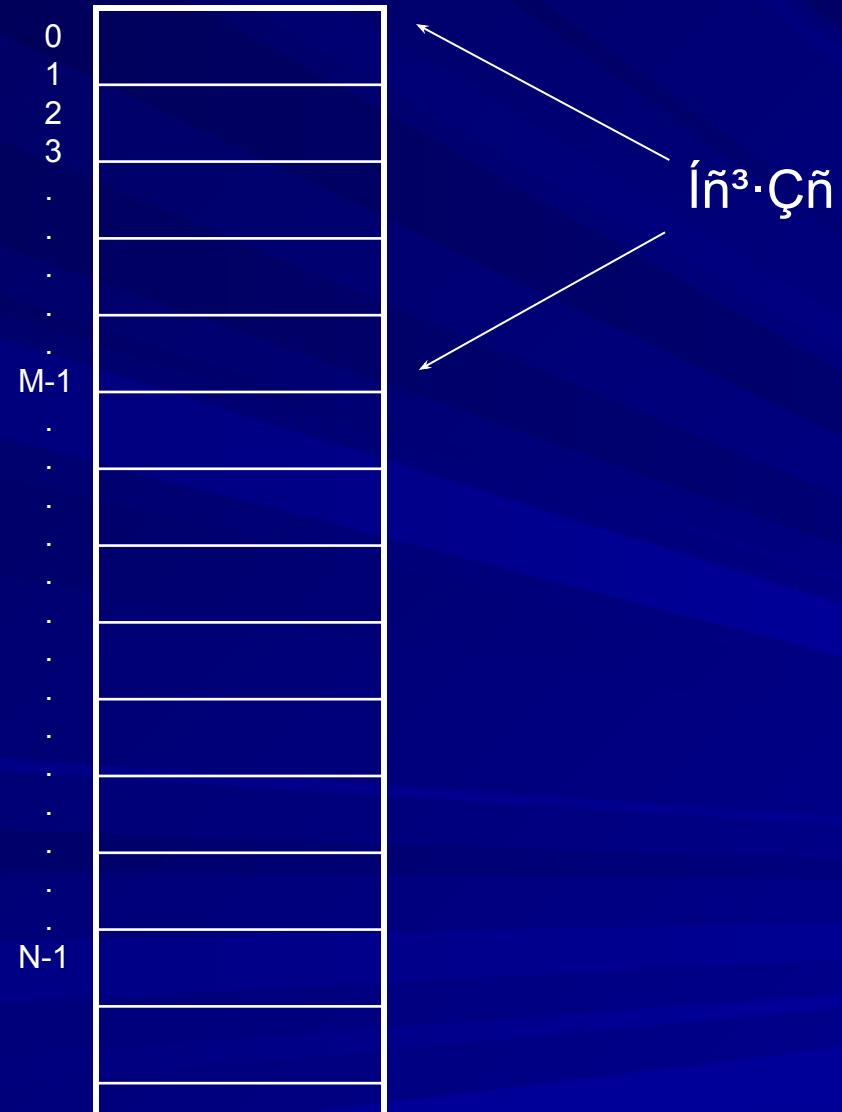
Ðñ³Ù³ÝÇ Í³í³ñÙ³Ý ÷áõÉ»ñ, ÍáÝí»Û»ñ

1. Ññ³Ù³ÝÇ ÁÝíñáõÙ ù»ß Í³Ù ûå»ñ³íÇí ÑÇßáÖáõÃÛáõÝÇó
2. Ññ³Ù³ÝÇ í»ñÍ³ÝáõÙ
3. ûå»ñ³Ý¹Ý»ñÇ Ñ³ëó»Ý»ñÇ áñáßáõÙ (Í³½Ù³ÍáñáõÙ)
4. ·áñÍáÖáõÃÛ³Ý Í³í³ñáõÙ
5. ³ñ¹ÛáõÝùÇ ·ñ³ÝóáõÙ

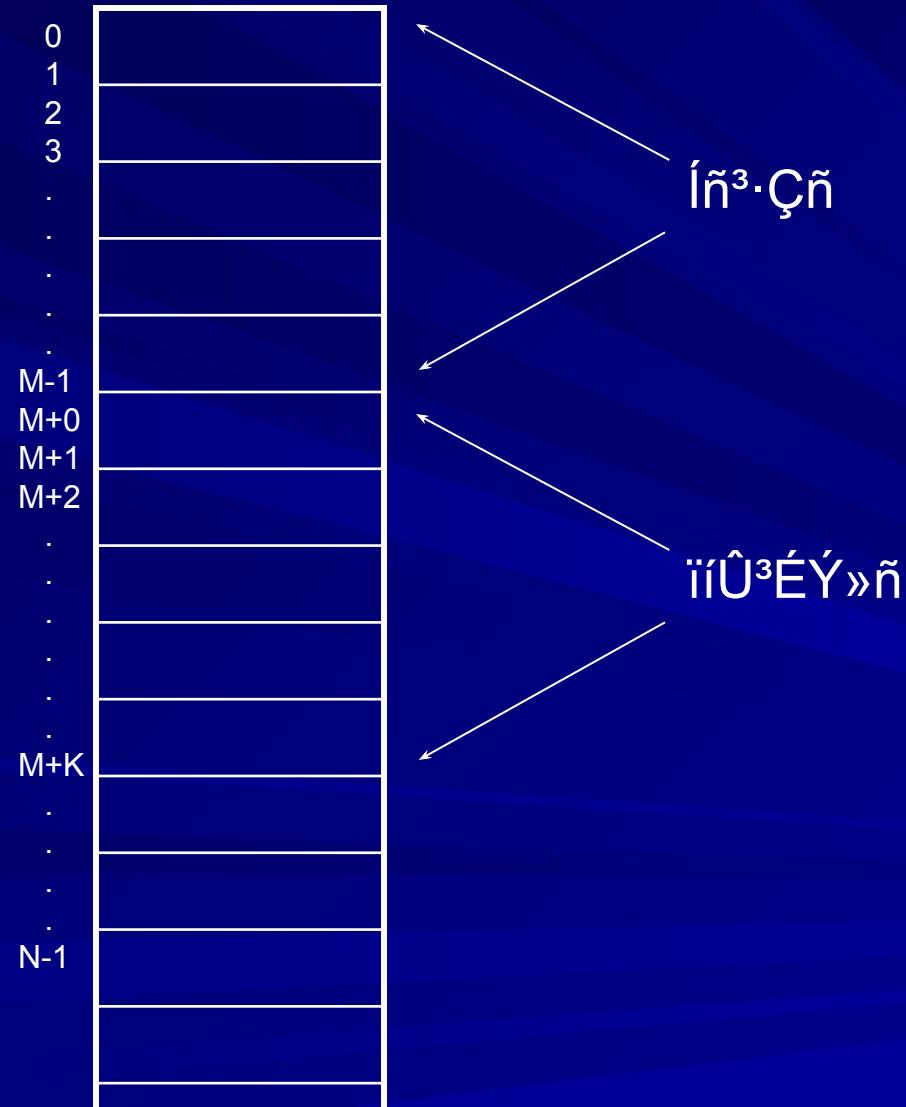
Առաջնահամար և հաստակություն



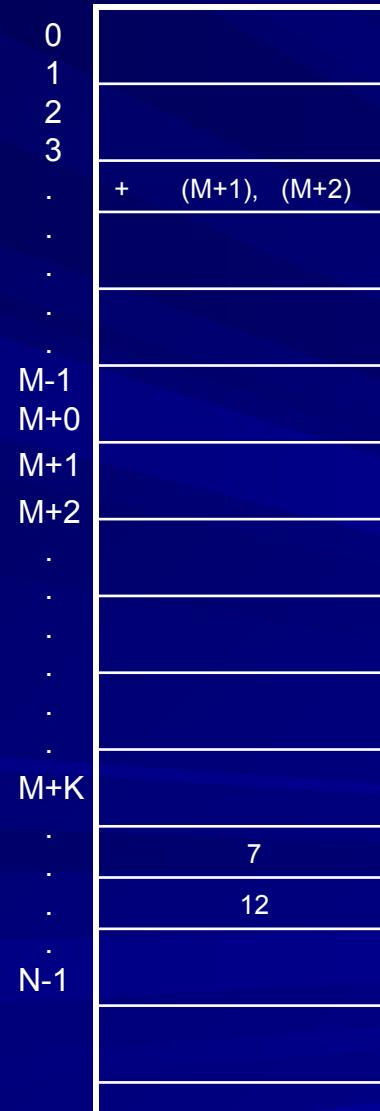
ê»·Ù»ÝiÝ»ñ »õ Ñ³ëó»³íáñáõÙ



Ê»·Ù»ÝÍÝ»ñ »õ Ñ³ëó»³íáñáõÙ



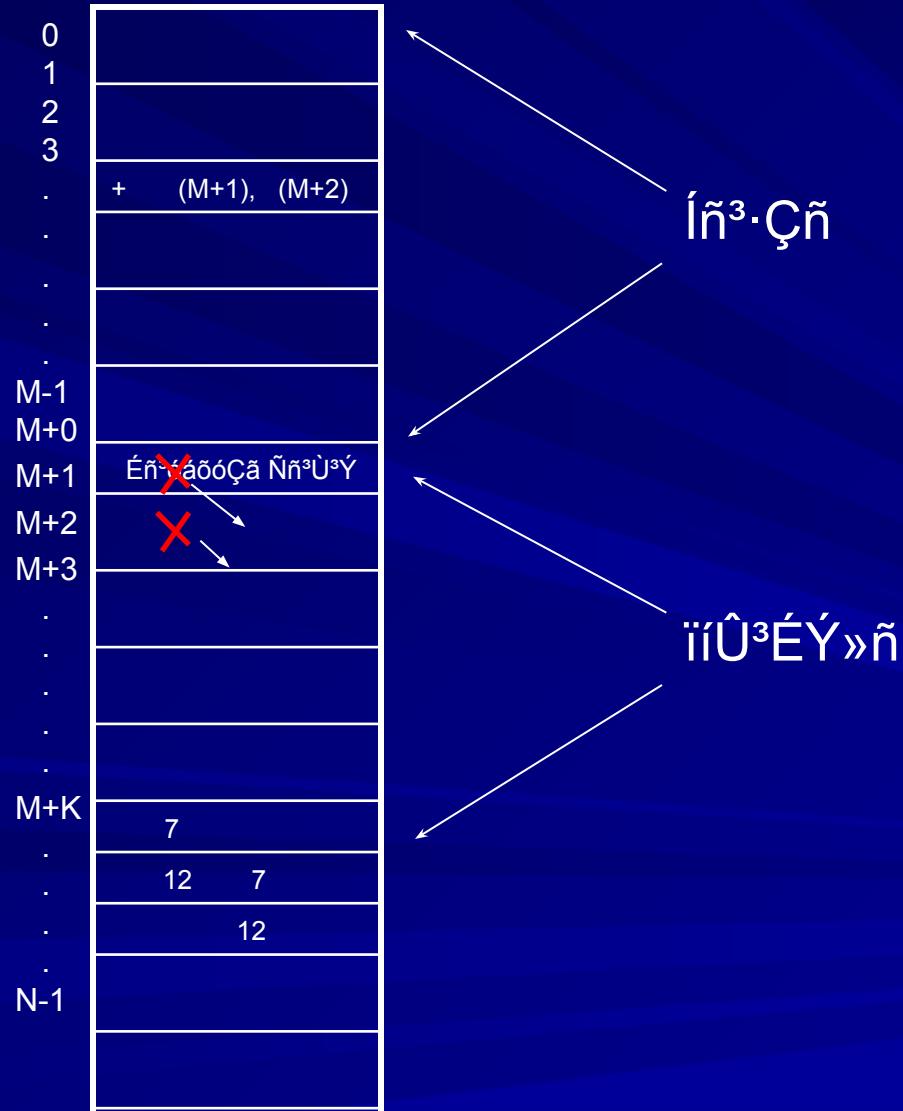
Ê»·Ù»ÝÍÝ»ñ »õ Ñ³ëó»³íáñáõÙ



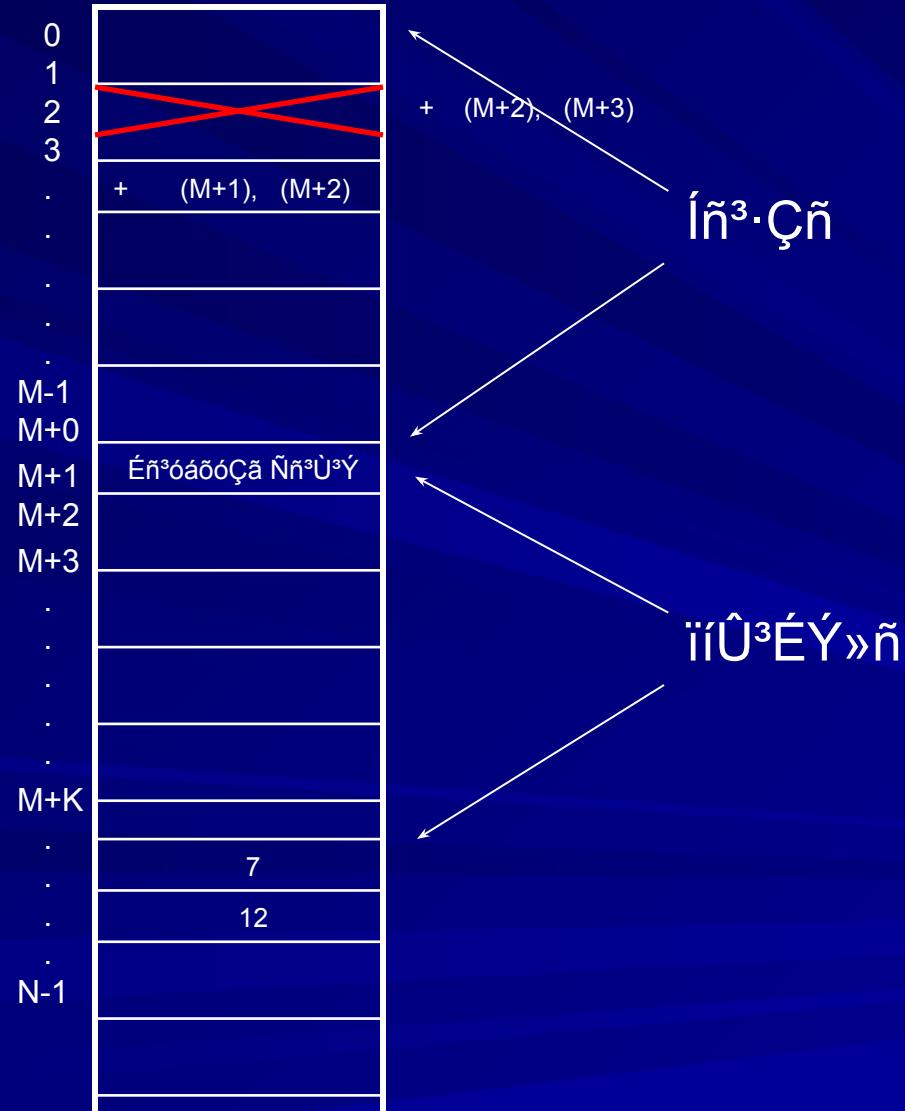
Íñ³·Çñ

ïíÙ³ÉÝ»ñ

Ê»·Ù»ÝÍÝ»ñ »õ Ñ³ëó»³íáñáõÙ



Ê»·Ù»ÝÍÝ»ñ »õ Ñ³ëó»³íáñáõÙ



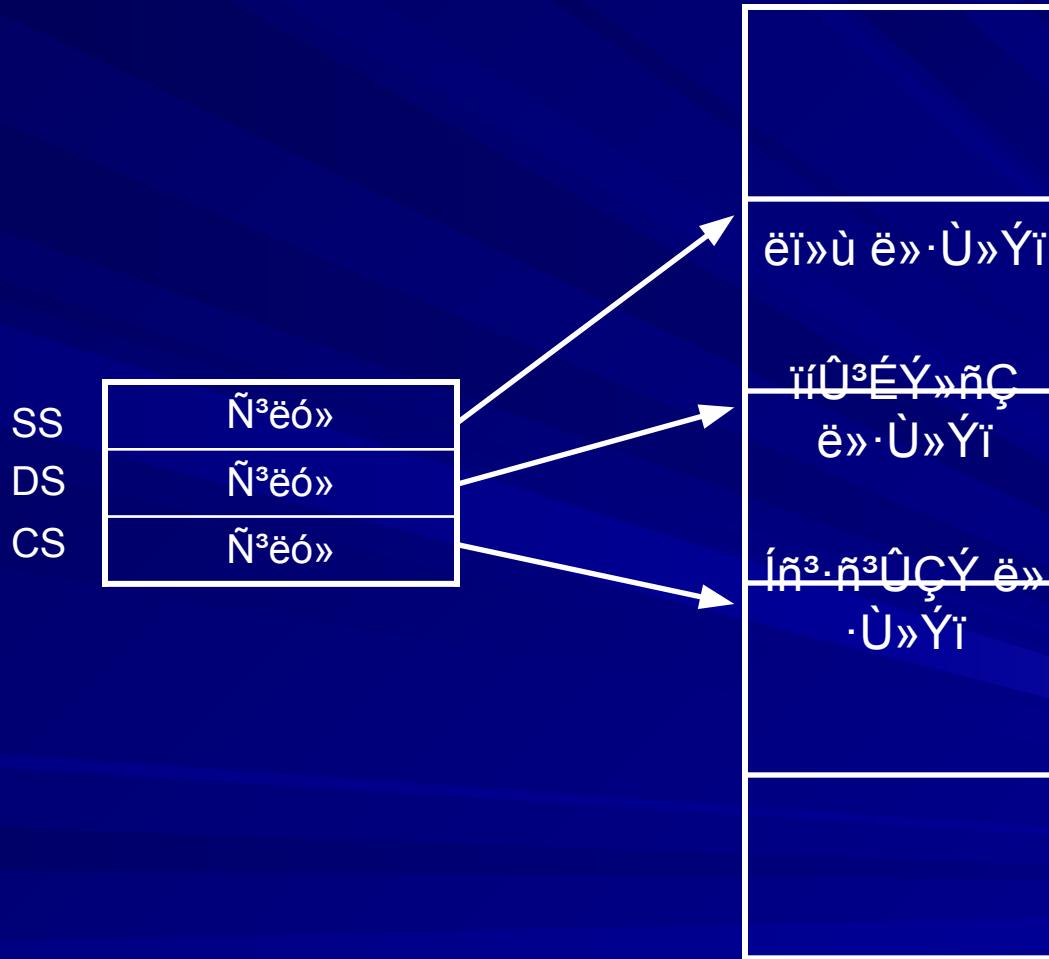
Ê»·Ù»ÝÍÝ»ñ »õ Ñ³ëó»³íáñáõÙ

0	
1	
2	
3	
.	+ 1, 2
.	
.	
M-1	
M+0	
M+1	
M+2	
.	
.	
.	
M+K	
.	
.	
7	
12	
.	
N-1	
.	
.	

Íñ³·Çñ

ííÙ³ÉÝ»ñ

ê»·Ù»ÝiÝ»ñ
»õ ë»·Ù»Ýi³ÛÇÝ é»·ÇëiñÝ»ñ



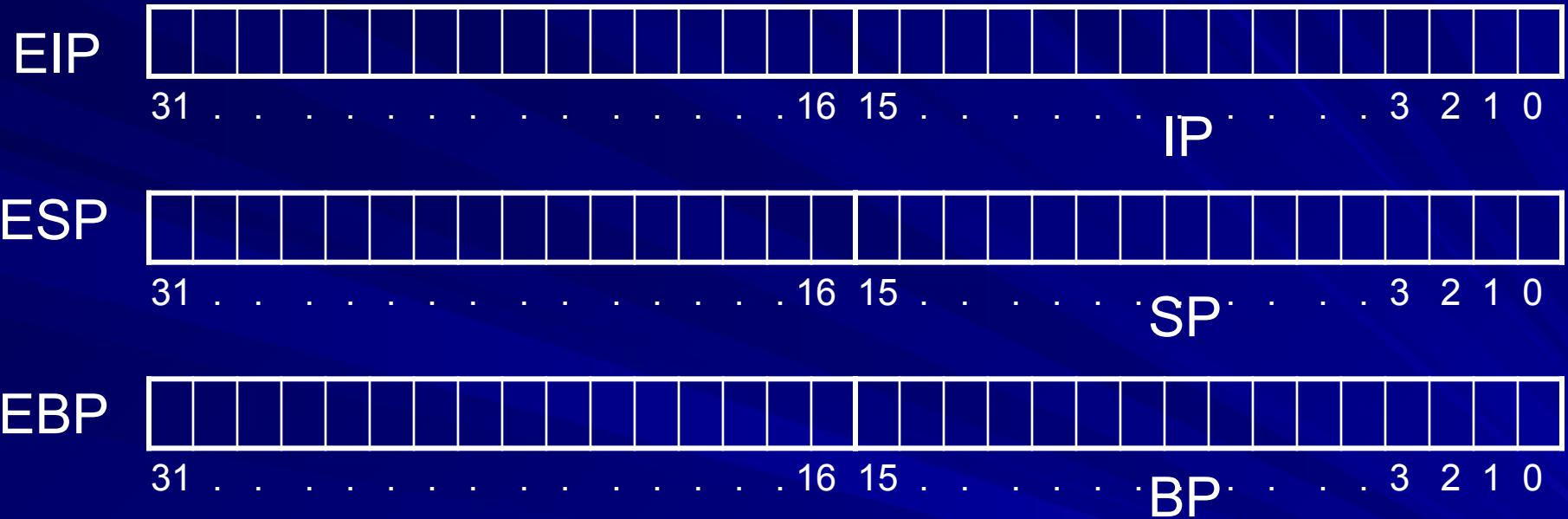
ê»·Ù»ÝiÝ»ñ
»õ ë»·Ù»Ýi³ÛÇÝ é»·ÇeiiñÝ»ñ

1	0	1	1	0	0	0	1	1	1	0	1	0	0	0	0
15	.	.	.	.	.	.	.	.	.	.	.	3	2	1	0

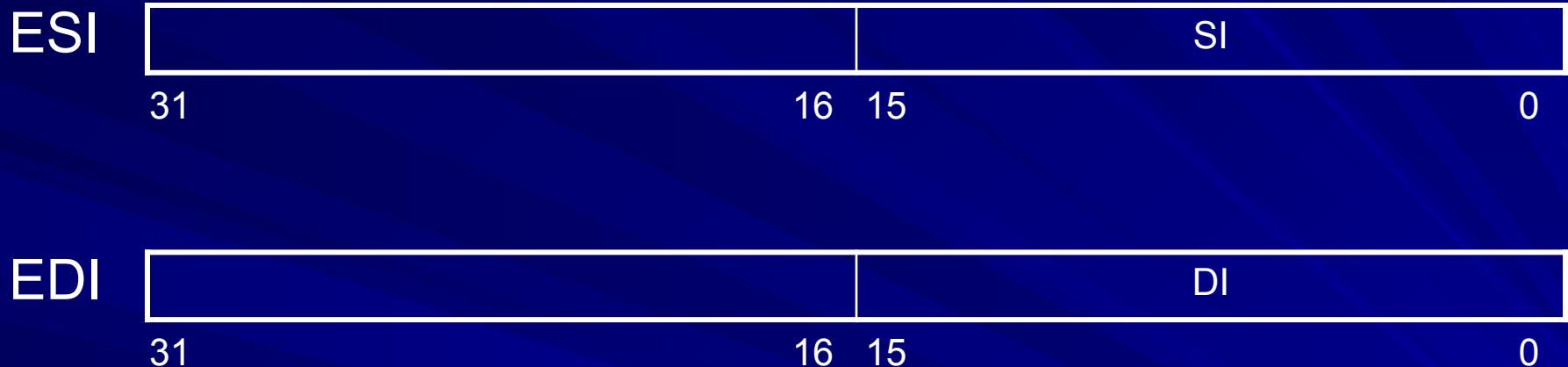
0 – Có ÙÇÝ»õ $2^{16} - 1$ Í³Ù 0 – Có ÙÇÝ»õ 65

535

ÒáõóÇã é»·ÇëïñÝ»ñ



ÆÝ¹»ùë³ÛÇÝ é»·ÇëïñÝ»ñ



ÀÝ¹Ñ³Ýáõñ Ýå³í³Ù³ÛÇÝ û·í³·áñÍÙ³Ý é»·ÇëïñÝ»ñ

AX



BX



CX



DX



ÀÝ¹Ñ³Ýáõñ Ýå³í³Í³ÛÇÝ û·í³·áñÍÙ³Ý é»·ÇëïñÝ»ñ



MOV AH, 1
MOV AL, 1
AX - ?

äñáó»ëáñÇ íÇ×³ïÇ »õ Õ»ï³í³ñÙ³Ý é»·Çëïñ
(¹ñáßÝ»ñÇ é»·Çëïñ)

Flags

EFlags

