**ΑΣΚΗΣΗ 2**

Τμημα: Α5

Συνεργατες:

Αλεξιος Λαζανας 1100605

Σταματια Καλημερη 1103080

Καταχωρητες που δοθηκαν στο εργαστηριο:

ACC: 0000

PC: 0001

X: 0010

Ψευδογλωσσα των ζητουμενων μικροπρογραμματων:

LDA #Κ:

PC+1->PC,MAR

MDR+0->ACC

PC+1->PC,MAR

NEXT(PC)

LDX #K:

PC+1->PC,MAR

MDR+0->X

PC+1->PC,MAR

NEXT(PC)

LDA ($K)

PC+1->PC,MAR

MDR+0->ACC

ACC+0->MAR

MDR+0->ACC

ACC+0->MAR

MDR+0->ACC

PC+1->PC,MAR

NEXT(PC)

LDAX

X+0->MAR

MDR+0->ACC

PC+1->PC,MAR

NEXT(PC)

MOVEAX

X+0->ACC

PC+1->PC,MAR

NEXT(PC)

LDA K(Χ)

PC+1->PC,MAR

MDR+0->ACC

ACC+X->ACC

ACC+0->MAR

MDR+0->ACC

PC+1->PC,MAR

NEXT(PC)

STA $K

PC+1->PC,MAR

MDR+0->X

X+0->MAR

ACC+0->NOP,MWE

PC+1->PC,MAR

NEXT(PC)

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| **Mapper** | | |
| Κώδικας εντολής | Opcode/Θέση | Περιεχόμενα |
| LDA #Κ | **0000 00H** | 2H |
| LDX #Κ | **01H** | 7H |
| LDA ($K) | **02H** | BH |
| LDAX | **03H** | 13H |
| LDA K(Χ) | **04H** | 17H |
| MOVEAX | **05H** | 1EH |
| STA $Κ | **06H** | 21H |

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| **Main Memory** | | |
| Κώδικας εντολής | Θέση | Περιεχόμενο |
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ΜΙΚΡΟΠΡΟΓΡΑΜΜΑΤΑ

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| **BOOTSTRAP** | BRA | BIN | CON | I | I | I | APORT | BPORT | DDATA | SH~ | SELB | MWE~ | MARCLK | MSTATUS | LDS~ | PCE~ | CARRYE~ | MDE~ | DDATAE~ | **ADDRESS** |
|  | (4:0) | (2:0) | (2:0) | (2:0) | (5:3) | (8:6) | (3:0) | (3:0) | (1:0) |  |  |  |  |  |  |  |  |  |  |  |
| SW+0->PC,MAR | xxxxx | 000 | χχχ | 111 | 000 | 011 | χχχχ | 0001 | χχ | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | m00 |
| NEXT(PC) | xxxxx | 000 | χχχ | χχχ | χχχ | 001 | χχχχ | χχχχ | χχ | χ | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | m01 |

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| **LDA #Κ** | BRA | BIN | CON | I | I | I | APORT | BPORT | DDATA | SH~ | SELB | MWE~ | MARCLK | MSTATUS | LDS~ | PCE~ | CARRYE~ | MDE~ | DDATAE~ | **ADDRESS** |
|  | (4:0) | (2:0) | (2:0) | (2:0) | (5:3) | (8:6) | (3:0) | (3:0) | (1:0) |  |  |  |  |  |  |  |  |  |  |  |
| PC+1->PC,MAR | xxxxx | 000 | χχχ | 101 | 000 | 011 | 0001 | 0001 | 01 | Χ | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | m02 |
| MDR+0->ACC | xxxxx | 000 | χχχ | 111 | 000 | 011 | χχχχ | 0000 | χχ | Χ | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | m03 |
| PC+1->PC,MAR | xxxxx | 000 | χχχ | 101 | 000 | 011 | 0001 | 0001 | 01 | Χ | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | m04 |
| NEXT(PC) | xxxxx | 000 | χχχ | χχχ | χχχ | 001 | χχχχ | χχχχ | χχ | χ | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | m05 |

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| **LDX #Κ** | BRA | BIN | CON | I | I | I | APORT | BPORT | DDATA | SH~ | SELB | MWE~ | MARCLK | MSTATUS | LDS~ | PCE~ | CARRYE~ | MDE~ | DDATAE~ | **ADDRESS** |
|  | (4:0) | (2:0) | (2:0) | (2:0) | (5:3) | (8:6) | (3:0) | (3:0) | (1:0) |  |  |  |  |  |  |  |  |  |  |  |
| PC+1->PC,MAR | xxxxx | 000 | χχχ | 101 | 000 | 011 | 0001 | 0001 | 01 | Χ | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | m06 |
| MDR+0->Χ | xxxxx | 000 | χχχ | 111 | 000 | 011 | χχχχ | 0010 | χχ | Χ | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | m07 |
| PC+1->PC,MAR | xxxxx | 000 | χχχ | 101 | 000 | 011 | 0001 | 0001 | 01 | Χ | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | m08 |
| NEXT(PC) | xxxxx | 000 | χχχ | χχχ | χχχ | 001 | χχχχ | χχχχ | χχ | χ | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | m09 |

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| **LDA #Κ** | BRA | BIN | CON | I | I | I | APORT | BPORT | DDATA | SH~ | SELB | MWE~ | MARCLK | MSTATUS | LDS~ | PCE~ | CARRYE~ | MDE~ | DDATAE~ | **ADDRESS** |
|  | (4:0) | (2:0) | (2:0) | (2:0) | (5:3) | (8:6) | (3:0) | (3:0) | (1:0) |  |  |  |  |  |  |  |  |  |  |  |
| PC+1->PC,MAR | xxxxx | 000 | χχχ | 101 | 000 | 011 | 0100 | 0100 | 01 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | m02 |
| MDR+0->ACC | xxxxx | 000 | χχχ | 111 | 000 | 011 | χχχχ | 0101 | χχ | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | m03 |
| ACC+0->NOP,MAR | xxxxx | 000 | χχχ | 100 | 000 | 001 | 0101 | χχχχ | χχ | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | m04 |
| MDR+0->ACC | xxxxx | 000 | χχχ | 111 | 000 | 011 | χχχχ | 0101 | χχ | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | m05 |
| PC+1->PC,MAR | xxxxx | 000 | χχχ | 101 | 000 | 011 | 0100 | 0100 | 01 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | m06 |
| NEXT(PC) | xxxxx | 000 | χχχ | χχχ | χχχ | 001 | χχχχ | χχχχ | χχ | χ | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | m07 |