

2^η σειρά ασκήσεων

Οι παρακάτω ασκήσεις χρησιμοποιούν τις εντολές που περιγράφονται στη διαφάνεια 33 του αρχείου comp_arch2 (Κεφάλαιο 2 του βιβλίου) και αναφέρονται και πιο κάτω.

Op-code	Operand	Description
1	RXY	LOAD the register R with the bit pattern found in the memory cell whose address is XY. <i>Example:</i> 14A3 would cause the contents of the memory cell located at address A3 to be placed in register 4.
2	RXY	LOAD the register R with the bit pattern XY. <i>Example:</i> 20A3 would cause the value A3 to be placed in register 0.
3	RXY	STORE the bit pattern found in register R in the memory cell whose address is XY. <i>Example:</i> 35B1 would cause the contents of register 5 to be placed in the memory cell whose address is B1.
4	ORS	MOVE the bit pattern found in register R to register S. <i>Example:</i> 40A4 would cause the contents of register A to be copied into register 4.
5	RST	ADD the bit patterns in registers S and T as though they were two's complement representations and leave the result in register R. <i>Example:</i> 5726 would cause the binary values in registers 2 and 6 to be added and the sum placed in register 7.
6	RST	ADD the bit patterns in registers S and T as though they represented values in floating-point notation and leave the floating-point result in register R. <i>Example:</i> 634E would cause the values in registers 4 and E to be added as floating-point values and the result to be placed in register 3.
7	RST	OR the bit patterns in registers S and T and place the result in register R. <i>Example:</i> 7CB4 would cause the result of ORing the contents of registers B and 4 to be placed in register C.

8 RST AND the bit patterns in register S and T and place the result in register R.

Example: 8045 would cause the result of ANDing the contents of registers 4 and 5 to be placed in register 0.

9 RST EXCLUSIVE OR the bit patterns in registers S and T and place the result in register R.

Example: 95F3 would cause the result of EXCLUSIVE ORing the contents of registers F and 3 to be placed in register 5.

A R0X ROTATE the bit pattern in register R one bit to the right X times. Each time place the bit that started at the low-order end at the high-order end.

Example: A403 would cause the contents of register 4 to be rotated 3 bits to the right in a circular fashion.

B RXY JUMP to the instruction located in the memory cell at address XY if the bit pattern in register R is equal to the bit pattern in register number 0. Otherwise, continue with the normal sequence of execution. (The jump is implemented by copying XY into the program counter during the execute phase.)

Example: B43C would first compare the contents of register 4 with the contents of register 0. If

the two were equal, the pattern 3C would be placed in the program counter so that the next

instruction executed would be the one located at that memory address. Otherwise, nothing would

be done and program execution would continue in its normal sequence.

C 000 HALT execution.

Example: C000 would cause program execution to stop.

1. Ποια από τις παρακάτω εντολές αλλάζει τα περιεχόμενα ενός κελιού μνήμης;

A. 10AB, B. 20AB, Γ. 30AB, Δ. 40AB

Απάντηση: Γ

2. 2. Ποια από τις παρακάτω εντολές βάζει την τιμή 00000000 στον καταχωρητή A;
 A. 1A00, B. 2A00, Γ. 3A00, Δ. 200A
 Απάντηση: Γ
3. Ποια από τις παρακάτω εντολές βάζει την τιμή 00000000 στον καταχωρητή 5;
 A. 25FF, B. 9555, Γ. 15FF, Δ. 8555
 Απάντηση: B
4. Ποια από τις παρακάτω εντολές δε θα αλλάξει τα περιεχόμενα του καταχωρητή 5;
 A. 1508, B. 2508, Γ. A503, Δ. A508
 Απάντηση: Δ
5. Ποια από τις παρακάτω εντολές αλλάζει τα περιεχόμενα του καταχωρητή 7;
 A. 4077, B. 4075, Γ. 4057, Δ. 37BB
 Απάντηση: Γ
6. Γράψτε ένα πρόγραμμα που προσθέτει τους αριθμούς $2\frac{3}{4}$ και $-1\frac{1}{8}$ και τους αποθηκεύει στη μνήμη στη διεύθυνση 05. Εξηγείστε συνοπτικά τι κάνει η κάθε εντολή

01101011 ($2\frac{3}{4}$) → 6B
 11011001 ($-1\frac{1}{8}$) → D9

Πρόγραμμα
206B
21D9
6201
3205
C000

7. Γράψτε ένα πρόγραμμα που εκτελεί το εξής. Αν στη θέση μνήμης C2 ο αριθμός που είναι αποθηκευμένος είναι το -2 (συμπλήρωμα ως προς 2), τότε στη θέση μνήμης 30 να αποθηκευτεί η τιμή 21 (δεκαδικό), αλλιώς να αποθηκευτεί η τιμή 5 στην C3. Εξηγείστε συνοπτικά τι κάνει η κάθε εντολή

FE είναι το -2
 00000101 (5 δεκαδικό ή 05 στο δεκαεξαδικό)
 00010101 (21 δεκαδικό ή 15 στο δεκαεξαδικό)

Πρόγραμμα
00 20FE
02 11C2
04 2215
06 B10C
08 3230
0A C000
0C 2405
0E 34C3
10 C000