



Republic of Iraq
Ministry of Higher Education and
Scientific Research
Al-Furat Al-Awsat Technical University
Engineering Technical College/Najaf
Al Najaf Al Ashraf, 31001. Iraq.

8085 Microprocessor

Lecture 7

المدرس ضرغام الخفاف الاسدي

Third Year lecture notes

Avionics Engineering Dept.

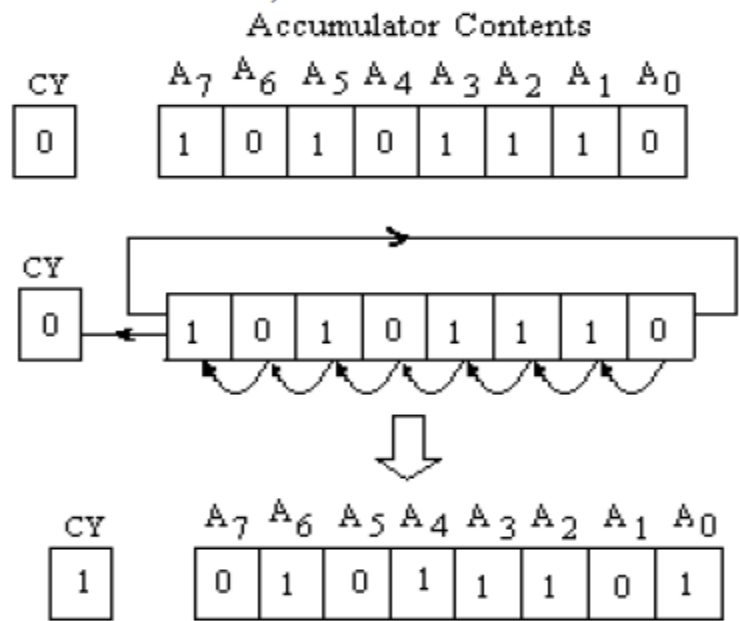
Engineering Technical College/ NAJAF 2020-2021

Lecturer: Dhurgham Al-Khaffaf Alasady

Rotate Instructions

In rotate instructions, the accumulator contents are shifted either left or right. In some instructions shifting may be through CY flag or without CY flag. Following are the rotate instructions.

1- RLC (Rotate Accumulator Left) In this instruction, the bits of the accumulator contents are shifted or rotated left. The LSB of the accumulator is changed as MSB (before the execution). The CY flag is modified as MSB (before the execution).



For example $A = AE$ H and $CY = 0$, before the execution of the instruction RLC. After the execution of the instruction MSB is saved in CY flag and also in the LSB of the accumulator. The other bits are shifted left as shown above.

i.e. $[A_{n+1}] \leftarrow [A_n]$
 $[A_0] \leftarrow [A_7]$ also $[CY] \leftarrow [A_7]$

Only carry flag CY will be affected in this instruction and all other flags will be unaffected.

2- RAL (Rotate Accumulator Left Through Carry) In this instruction, the bits of the accumulator contents will be shifted / rotated left through carry. The content of carry flag CY will be stored in LSB of the accumulator and MSB of the accumulator will be stored in CY flag. All other bits of the accumulator will be shifted to the left. For example if A = 6A H and CY = 1 before the execution of RAL instruction, then after the execution of this instruction the accumulator contents will be shifted as shown in figure 4.5.

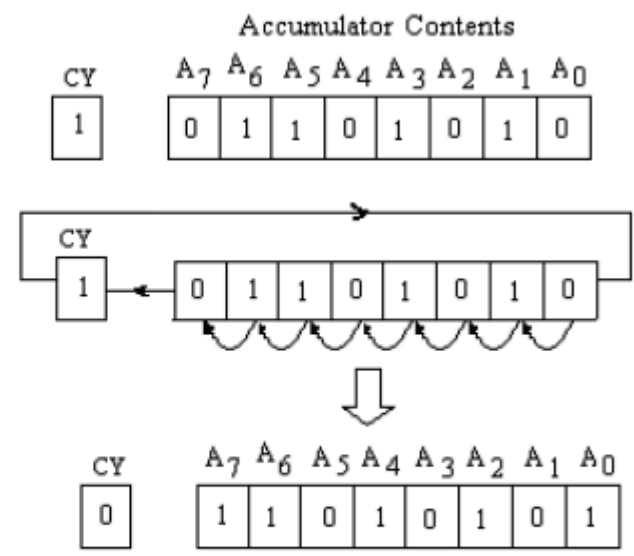


Fig. 4.5

In this instruction too only carry flag will be affected.

3- RRC (Rotate Accumulator Right) In this instruction, all the bits of accumulator are shifted or rotated right. The MSB of the accumulator is changed as LSB (before the execution). The CY flag is modified as MSB (before the execution). For example $A = 93$ H and $CY = 0$, before the execution of the instruction RRC. After the execution of this instruction LSB is saved in CY flag and also in the MSB of the accumulator. The other bits are shifted left as shown in figure 4.6.

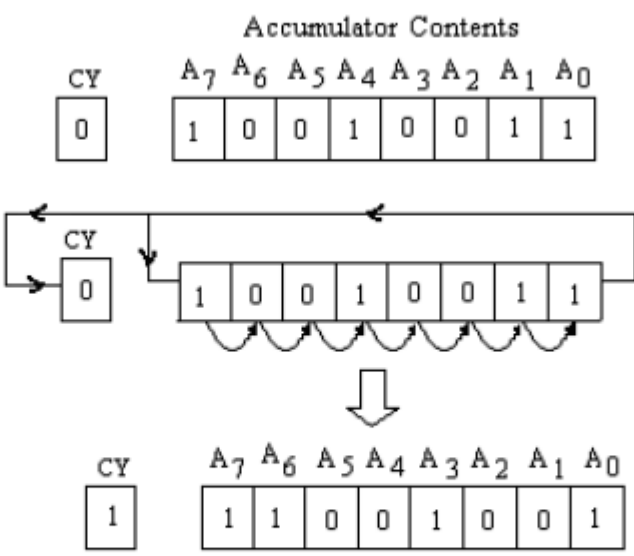


Fig. 4.6

In this instruction only carry flag CY will be affected and all other flags will be unaffected.

4- RAR (Rotate Accumulator Right Through Carry) In this rotate instruction, all the bits of the accumulator contents will be shifted /rotated right through carry. The content of carry flag CY will be stored in MSB of the accumulator and LSB of the accumulator will be stored in CY flag; and all other bits of the accumulator will be shifted to the right. For example if A = 76 H and CY = 1 before the execution of RAR instruction, then after the execution of this instruction the accumulator contents will be shifted as shown in figure 4.7.

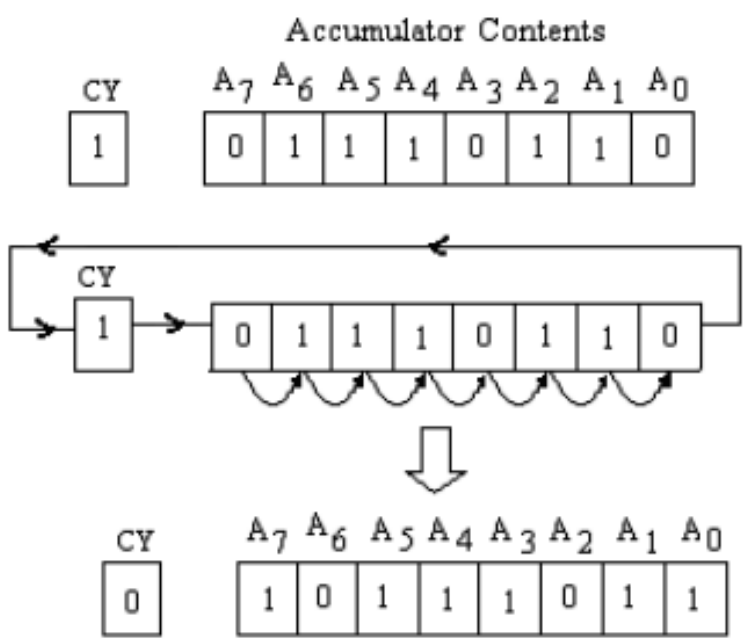


Fig. 4.7

In this instruction too only carry flag will be affected.

Thank you