* Questions on addressing Modes L-12

Memory

200	Opcode | Mode	~~Mode~~
201	Add. = 500	
202	Next instruction	
399	450	
400	700	
500	800	
600	900	
702	Target instruction	
800	300	

Registers

PC = 200 | 202

Reg = 400 | 399

XR = 100
(Index Reg.)

AC

* calculate the effective address and the operand for every given mode based on the memory information given above?

	Mode	Effective add.	operand
1	Immediate Mode	201	500
2	Direct Mode	500	800
3	Indirect Mode	800	300
4	Register Mode	—	400
5	" Indirect Mode	400	700
6	Autoincrement Mode (Pre decrement)	399	450
7	Indexed Mode	500+100=600	900
8	PC - Relative Mode	202+500	—

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* Note: we do not have effective add. for registers?

Question: 1
An instruction is stored at location 300 with its add. field at location 301. The add. field has the value 250. A processor register R1 contains the number 200. Evaluate the effective address, if addressing mode is:

1) Direct — 250
2) Relative — 302+250
3) Register Indirect — 200

PC = 302

300	instruction
301	add. 250

Reg
200

Q2: A relative branch mode type instruction is stored in memory add. at 300. The branch is made to an add. 450

① what should be the value of relative add. field of instruction?

Memory

300	instruction

PC = 301

Ans: Target add. = 450
" = PC + offset
450 = 301 + offset
offset = 149 Ans

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Q Determine the value of PC before instruction fetch, after the fetch and after execution phase?

Ans Before fetch = 300
After " = 301
After Execution = 450

* Note Special purpose register are never explicitly addressed.

LW → Loading content from RAM to register
CMP → Compare
Beq → Branch if equal