

Chapter 6 • Section 6.5 — Exercises (Mazidi)

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Problems are paraphrased to respect copyright. Short derivations shown for each.

53) If `LDR R2,[PC,#8]` is located at address `0x300`, what memory address is accessed?

ARM state rule: $PC_{\text{effective}} = \text{current_address} + 8$.

Here: $PC_{\text{effective}} = 0x300 + 0x8 = 0x308$.

$EA = PC_{\text{effective}} + 0x8 = 0x308 + 0x8 = **0x310**$.

Answer: `0x00000310`.

54) Using PC-relative addressing, write an `LDR` that accesses a location `0x20` bytes ahead of itself.

We want $EA = \text{current_address} + 0x20 = (\text{current_address} + 0x8) + \text{imm}$.

Therefore $\text{imm} = 0x20 - 0x8 = 0x18$.

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LDR    R2, [PC, #0x18]    ; accesses (this instruction address + 0x20)
```

(In Thumb state, use `#0x1c` because $PC = \text{addr} + 4$.)

Notes for learners

- `ADR Rd, label` emits a PC-relative add; `LDR Rd,=imm` is often assembled into a **literal load** via a PC-relative address.