

|         |  |  |  |  |  |  |  |  |  |                                                      |  |       |  |      |  |          |  |            |  |              |        |  |                              |  |           |  |                                      |  |                                      |  |                      |  |
|---------|--|--|--|--|--|--|--|--|--|------------------------------------------------------|--|-------|--|------|--|----------|--|------------|--|--------------|--------|--|------------------------------|--|-----------|--|--------------------------------------|--|--------------------------------------|--|----------------------|--|
| TITLE   |  |  |  |  |  |  |  |  |  | L09 · Load and Store Semantics                       |  | VER.  |  | 1    |  | DATETIME |  | 21.07.2026 |  | QR wyłączony |        |  |                              |  |           |  |                                      |  |                                      |  |                      |  |
| PROJECT |  |  |  |  |  |  |  |  |  | Jednostka load/store RV32I                           |  |       |  |      |  |          |  |            |  |              | SERIES |  | RV32I From Blinker to RISC-V |  | CARD      |  | 09/09                                |  | SHEET                                |  | 1/2                  |  |
| SUBJ.   |  |  |  |  |  |  |  |  |  | Inf.                                                 |  | PROG. |  | CORE |  | SCOPE    |  | LEVEL      |  |              | POS.   |  | GITEA UUID                   |  | CARD UUID |  | f1efc445-93bd-5c0b-b631-52fc5a9ba943 |  | f1efc445-93bd-5c0b-b631-52fc5a9ba943 |  | AUTHOR M. PABISZCZAK |  |
| GITEA   |  |  |  |  |  |  |  |  |  | https://gitea.local/edu-inf/lab-rv32i-asm-load-store |  |       |  |      |  |          |  |            |  |              |        |  |                              |  |           |  |                                      |  |                                      |  |                      |  |
| HTML    |  |  |  |  |  |  |  |  |  | http://localhost:8080                                |  |       |  |      |  |          |  |            |  |              |        |  |                              |  |           |  |                                      |  |                                      |  |                      |  |
|         |  |  |  |  |  |  |  |  |  |                                                      |  |       |  |      |  |          |  |            |  |              |        |  |                              |  |           |  |                                      |  |                                      |  |                      |  |

# Cel karty

Uczeń implementuje linie bajtowe store, rozszerzanie load i zintegrowaną LSU z kontrolą wyrównania.

# Zakres tasków

| Krok | Numer tasku | Najważniejsza idea | Priorytet   | Status     | Version |
|------|-------------|--------------------|-------------|------------|---------|
| 11   | Task01      | maski SB/SH/SW     | obowiązkowe | opracowane | v00.01  |
| 11   | Task02      | LB/LH/LW/LBU/LHU   | obowiązkowe | opracowane | v00.01  |
| 11   | Task03      | zintegrowana LSU   | obowiązkowe | opracowane | v00.01  |

|                                                                                                                               |  |       |  |      |  |                                |  |       |  |      |  |            |  |                                      |  |              |      |  |       |  |       |  |     |  |
|-------------------------------------------------------------------------------------------------------------------------------|--|-------|--|------|--|--------------------------------|--|-------|--|------|--|------------|--|--------------------------------------|--|--------------|------|--|-------|--|-------|--|-----|--|
| TITLE                                                                                                                         |  |       |  |      |  | L09 · Load and Store Semantics |  | VER.  |  | 1    |  | DATE/TIME  |  | 21.07.2026                           |  | QR wyłączony |      |  |       |  |       |  |     |  |
| PROJECT                                                                                                                       |  |       |  |      |  | Jednostka load/store RV32I     |  |       |  |      |  | SERIES     |  | RV32I From Blinker to RISC-V         |  |              | CARD |  | 09/09 |  | SHEET |  | 2/2 |  |
| SUBJ.                                                                                                                         |  | PROJ. |  | CORE |  | SCOPE                          |  | LEVEL |  | POS. |  | GITEA UUID |  | f1efc445-93bd-5c0b-b531-52fc5a9ba943 |  |              |      |  |       |  |       |  |     |  |
| Inf.                                                                                                                          |  |       |  |      |  |                                |  |       |  |      |  | CARD UUID  |  | f1efc445-93bd-5c0b-b531-52fc5a9ba943 |  |              |      |  |       |  |       |  |     |  |
|                                                                                                                               |  |       |  |      |  |                                |  |       |  |      |  |            |  | AUTHOR M. Pabiszczak                 |  |              |      |  |       |  |       |  |     |  |
|                                                                                                                               |  |       |  |      |  |                                |  |       |  |      |  |            |  |                                      |  |              |      |  |       |  |       |  |     |  |
| GITEA <a href="https://gitea.local/edu-inf/lab-rv32i-asm-load-store">https://gitea.local/edu-inf/lab-rv32i-asm-load-store</a> |  |       |  |      |  |                                |  |       |  |      |  |            |  |                                      |  |              |      |  |       |  |       |  |     |  |
| HTML <a href="http://localhost:8080">http://localhost:8080</a>                                                                |  |       |  |      |  |                                |  |       |  |      |  |            |  |                                      |  |              |      |  |       |  |       |  |     |  |

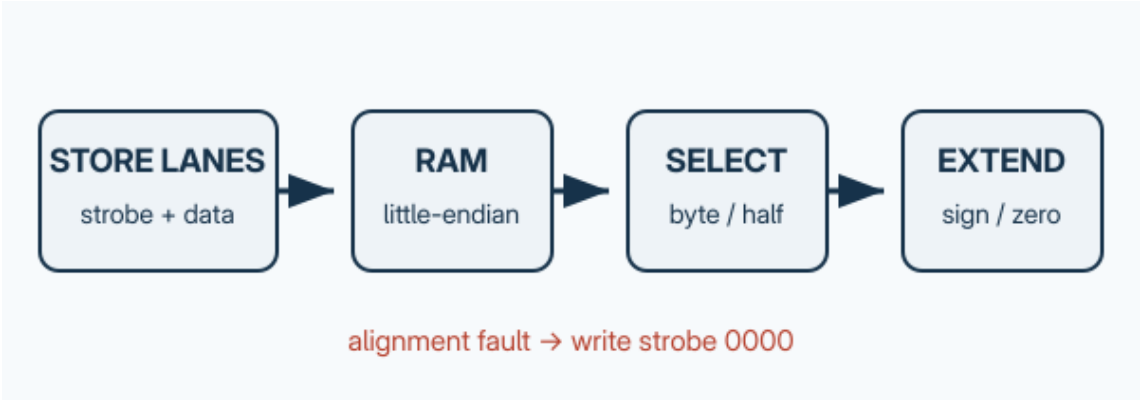
# 1 Task01 · Linie store

drzewka: D1 D2

K1: Przewidź maski SB +3, SH +2 i SW +0. D1

K2: Zmierz strobe, dane, fault i zapisz VCD. D2

Utwórz strobe i przesunięte dane dla SB, SH oraz SW. Niewyrównany halfword lub word musi dać fault i maskę zero.



Rysunek 1: Store wybiera linie RAM, a load wybiera i rozszerza fragment słowa.

## 2 Task02 · Rozszerzanie load

drzewka: D1 D2

K1: Porównaj LB/LBU dla 80 hex oraz LH/LHU dla 80ff hex. D1 D2

Wybierz bajt lub halfword zgodnie z little-endian. LB/LH replikują znak, LBU/LHU dopełniają zerami, LW zwraca słowo.

## 3 Task03 · Zintegrowana LSU

drzewka: D1 D2

K1: Zmierz 1122aa44, ffffffff, 000000aa i fault. D1 D2

Zapisz słowo 11223344, następnie bajt aa pod offsetem 1. Odczytaj pełne słowo, LB i LBU, a na końcu wymuś niewyrównany LW.