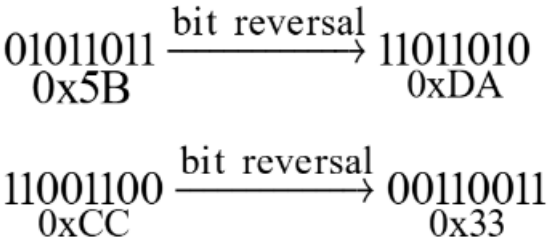
Lab 3 : Instruction Set

- Link
  - Document
  - Video

- **Basic** (50%)
  - **Description**
    Use bitwise instructions (NOT, AND, OR, XOR and ROTATE) to implement bit reversal on TRISA.

  - **Example**



  - **Standard of grading**
    1. Use at least one bitwise instruction to implement it.
    2. Do not use branch-related instructions, including CPFSGT, CPFSLT, CPFSEQ, TSTFSZ, and GOTO.
    3. Points will be deducted for any violation.

- **Advance** (30%)
  - **Description**
    Please implement a 16-bit subtractor.

  - **Example**

7458-4046=3412(hex)

Address	00	01
000	74	58
010	40	46
020	34	12

  - **Standard of grading**
    1. Place the minuend at [0x000]–[0x001], the subtrahend at [0x010–0x011] and store the result at [0x020]–[0x021].
    2. Do not use SUBWFB.

3. Points will be deducted for any violation.

- **Hard** (20%)
  - **Description**
    Store two 4-bit signed numbers (range: -8 to 7) in memory locations [0x000] and [0x001]. Implement multiplication of these two numbers and store the result in memory location [0x002]. All numbers are represented in two's complement form.

  - **Example**

Address	Testcase 1	Testcase 2
[0x000]	0xFE	0x04
[0x001]	0x05	0x05
[0x002]	0xF6	0x14

  - **Standard of grading**
    1. You must store the results in correct memory locations.
    2. Do not use MUL-related instructions.
    3. Do not expand and add them directly.
    4. Points will be deducted for any violation.

  - **Hint**
    You may first handle the sign conversion, and then proceed with the implementation of the multiplier logic.