

Lab03: Palindromic String

Task

A **palindromic string** is a string that reads the same forwards and backwards, such as "level" or "madam". Another famous example is the phrase Napoleon supposedly said when exiled to the island of Elba: "Able was I ere I saw Elba". When spaces are removed and the phrase is converted to lowercase, it becomes "ablewasieresawelba", which is also a palindromic string. Given a string S and its length N , can you determine if it is a palindromic string?

Your Job

Note that N ($0 \leq N \leq 99$) will be stored in `x3100`, and each character of S will be stored in successive memory locations starting with address `x3101`. You may assume that S only contains **a-z** and **A-Z**. Additionally, consider a string of length zero to be a palindromic string.

Determine if the given string S is a palindromic string. If it is, the result should be `1`; if it is not, the result should be `0`. Store the result in the specified memory location `x3200`.

R0-R7 are set to zeroes at the beginning, and your program should start at `x3000`.

Here are several examples:

Example 1:

Address	x3100	x3101	x3102	x3103	x3104	...	x3200
Value (Hex)	x0000	x0000	x0000	x0000	x0000		x0001
Value (Dec)	0	0	0	0	0		1
Character		\0	\0	\0	\0		

Example 2:

Address	x3100	x3101	x3102	x3103	x3104	...	x3200
Value (Hex)	x0003	x0061	x0062	x0063	x0000		x0000
Value (Dec)	3	97	98	99	0		0
Character		a	b	c	\0		

Example 2:

Address	x3100	x3101	x3102	x3103	x3104	...	x3200
Value (Hex)	x0004	x0061	x0062	x0062	x0061		x0001

Address	x3100	x3101	x3102	x3103	x3104	...	x3200
Value (Dec)	4	97	98	98	97		1
Character		a	b	b	a		

For your convenience, your code may be written as:

```

1  .ORIG x3000
2
3  LDI R0,LENGTH
4  LD R1,STRING      ; R1 is the pointer of the string
5
6  ; Begin of your code
7  ; ... ..
8  ; ... ..
9  ; End of your code
10
11 LENGTH .FILL x3100
12 STRING .FILL x3101
13 RESULT .FILL x3200
14
15 .END

```

You can modify this code and add it to the end of your code for testing.

```

1  .ORIG x3100
2  .FILL #5          ; Fill in x3100 with 5
3  .STRINGZ "abcba" ; Fill in "abcba" starting from x3101
4  .END

```

Score

Correctness for 50% and the report for other 50%.

Submission

Note that in this experiment, you are required to use **assembly code**.

Here are some notifications:

- Your program should start with `.ORIG x3000`.
- Your program should end with `.END`.
- Your last instruction should be `TRAP x25 (HALT)`.
- Include **comments** in your code where necessary for clarification.

Your submission should be structured as shown below:

```
1 PB*****_Name.zip
2 |— PB*****_Name_report.pdf
3 |— lab3.asm
```

Report

Your reports should contain at least the four parts below:

- purpose.
- principles.
- procedure (e.g. bugs you encountered and how to solve them).
- results of your test.