

CS311: Computer Organization

Homework #1

Junoh Moon junoh.moon@kaist.ac.kr

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Description In your first assignment, your goal is to write an MIPS assembly program, which determines whether an integer is a palindrome. An integer is a palindrome when it reads the same backward as forward. A **32-bit signed integer** is given through standard-input, and the expected output is **true** if the integer is a palindrome. Otherwise, the output is always **false**.

```
1  x = read_int()
2
3  if x is palindrome:
4      print_string("true\n")
5  else:
6      print_string("false\n")
```

Listing 1: Pseudo code of the description above

Since MIPS assembly is not compatible with X86/AMD64 architecture, a simulator called SPIM (or QtSPIM, which is the latest version of SPIM) will be given to test and debug your code. The basic usage of the simulator, a MIPS manual, and a sample code will be provided to you a better understanding of the basics.

Grading Policy The grading policy consists of two parts: code validation (70%) and the report (30%). Your code will be tested upon many testcases as well as the given examples. Moreover, you must submit the report in **pdf** format. The report must include your algorithm in detail and how you implement your algorithm.

Any cases of cheating or plagiarism will *not be* tolerated, and those who are caught will receive *zero* points. The following behaviours will be regarded as cheating: copying other student's work; modifying other student's work and using it as if it is your own; and all other sorts of inappropriate behaviours.

Submission Your homework must be submitted by **the end of October 5 (Monday)**. Late submission by one day is permitted with a *50 % penalty* to your total score. Lastly, students who do not submit the homework will get 0 point.

You must submit your assembly code and report, and their filenames must be **hw1_<student id>.s** and **hw1_<student id>.pdf**. The entirety of the report *must be written in English*.

Notes

- `read_int` system call reads and returns a 32-bit integer to a register. Thus, you can only focus on your logic.
- If you have questions about the assignment, please leave your questions on the KLMS Q&A board, rather than sending an email to TAs. Your question may help other students. If you send an email to a specific TA, we cannot guarantee that your question is shared with *all* the TAs, making it difficult to reply quickly.
- Due to the long holiday (Chuseok), replying to questions during the holiday may be slower than usual.
- Submitted codes will be tested on the latest QtSPIM (9.1.xx). Be aware of your workspace environment.
- A download link for QtSPIM is [here](#).
- Comments in your code must be written in **English**. CJK letters may raise errors during execution.
- Since SPIM does not simulate delay slot in default configuration, you can ignore it for this assignment.
- When reading an input, you can only use `read_int` system call. Any other read methods (e.g. `read_string`, `read_char`) are not allowed.
- *Submissions that do not follow the constraints above will be ignored.*

Examples

```
1 Input: 121
2 Output: true
```

```
1 Input: -121
2 Output: false
3 /* From left to right, it read -121.
4  * From right to left, it becomes 121-.
5  */
```

```
1 Input: 100
2 Output: false
3 /* From right to left, it becomes 001. */
```
