

Computer Organization Project 1 – MIPS Assembly 1

Due: 23:59, Mar. 20, 2024

In this start-up project, you are required to get familiar with both MARS (MIPS Assembler and Runtime Simulator) programming environment and basic MIPS (Microprocessor without Interlocked Pipeline Stages) instructions.

In Taiwan, the identification number is an UPPER-CASE English literal followed by 9 digits. The first digit indicates male (1) or female (2). The last digit is used for legality checking. Following is the procedure for checking the identification number:

1. Each English literal can be transformed into 2 digits (a_0 and a_1).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
10	11	12	13	14	15	16	17	34	18	19	20	21	22	35	23	24	25	26	27	28	29	32	30	31	33

2. Combine the 2 digits with the followed 9 digits to form 11 digits.

Ex: $a_0 a_1 a_2 a_3 a_4 a_5 a_6 a_7 a_8 a_9 a_{10}$

3. Perform the following summation and multiplication of the leading 10 digits.

$$SUM = 1 \cdot a_0 + 9 \cdot a_1 + 8 \cdot a_2 + 7 \cdot a_3 + 6 \cdot a_4 + 5 \cdot a_5 + 4 \cdot a_6 + 3 \cdot a_7 + 2 \cdot a_8 + 1 \cdot a_9$$

4. If the modulo 10 of the summation of SUM and the last digit (a_{10}) is 0, the identification number is legal; Otherwise, it is illegal.

$$\begin{cases} \text{Legal identification number : } (SUM + a_{10}) \% 10 = 0 \\ \text{Illegal identification number : } (SUM + a_{10}) \% 10 \neq 0 \end{cases}$$

You are required to write a program for checking the identification number. Please submit your source code according to the following rules:

- 1- Write down enough comments such that you would receive higher scores.
- 2- The filename is your student ID (e.g., B12345678.asm).

Example:

```
Please input an identification number:
H288252528
The number is legal.
```

```
Please input an identification number:
B100000001
The number is illegal.
```