

**CSE 331/531 Project 1:**  
**Palindrome Number Detector**  
**Using MARS Simulator**

**Deadline: 30/10/2024 First Project Exam 😊**

**Objective:**

The goal of this project is to design and implement a **Palindrome Number Detector** using **MIPS Assembly Language**. You will use the **MARS simulator** to write, assemble, and run your code. Your program will check whether a given integer (entered by the user) is a palindrome, and print a message on the console indicating if it is or is not a palindrome.

**What is a Palindrome Number?**

A **palindrome number** is a number that remains the same when its digits are reversed. Examples:

- **Palindrome numbers:** 121, 1331, 12321.
- **Not palindrome numbers:** 123, 102, 1345.

**Project Requirements:**

1. **Input:**
  - The program should prompt the user to enter an integer.
2. **Process:**
  - Your program will reverse the digits of the entered number.
  - It will compare the original number to the reversed number.
3. **Output:**
  - If the number is a palindrome, print: **"The number is a palindrome."**
  - If the number is not a palindrome, print: **"The number is not a palindrome."**

**Example:**

- **Input:** 121  
**Output:** "The number is a palindrome."
- **Input:** 123  
**Output:** "The number is not a palindrome."

### Design Outline:

#### 1. Input the Number:

- Use a MIPS **syscall** instruction to prompt and take user input for a number.

#### 2. Reverse the Number:

- Extract the digits of the number using modulo (%) and division (/) operations.
- Build the reversed number.

#### 3. Compare the Numbers:

- Compare the original number with the reversed number.

#### 4. Output the Result:

- Use a **syscall** to display the appropriate message.

### How to Verify Your Design Using MARS Simulator:

#### 1. Write the Program:

- Open MARS, and write your MIPS assembly code using the project outline provided.

#### 2. Assemble the Program:

- Click the **Assemble** button in MARS to check for any syntax errors in your code.

#### 3. Run the Program:

- After assembling successfully, click **Run**. The program will prompt for input, and based on your logic, it will display whether the number is a palindrome or not.

#### 4. Test Cases:

- Test your program with different inputs (both palindrome and non-palindrome numbers) to verify its correctness.

### Hints for the Project:

- You can use MIPS **pseudo-instructions** to simplify your coding (e.g., move, li).
- Use **syscalls** for input/output operations in MIPS.
- Don't forget to handle both single-digit and multi-digit numbers correctly.