

CSE222 Digital Design and Computer Architecture

Project 01: Write MIPS program to convert numbers

(Spring 2023, SCCC)

▪ Function

Write a MIPS program to implement functions to convert a number from one number system to another.

▪ Requirement:

1. Write a MIPS program to:
 - a. Convert binary number to decimal and hexadecimal number
 - b. Convert decimal number to binary and hexadecimal number
 - c. Convert hexadecimal number to binary and decimal number
2. The MIPS program **repeatedly** displays the following menu:
 1. **Binary to hexadecimal and decimal**
 2. **Hexadecimal to binary and decimal**
 3. **Decimal to binary and hexadecimal**
 4. **Exit**

User enters a number (1 to 3) to select one item from the menu to perform a conversion: once a menu item is selected, user is prompt to enter a number (**in string**) which is the source value. If this source is valid, it will be converted to destination numbers. Display message: **source number, destination-1 number, destination-2 number**. For example, if menu item 1 is select, the message will be:

Binary number: *[binary-number]*

Decimal number: *[decimal-number]*

Hexadecimal number: *[hexadecimal-number]*

After this message is displayed, the menu will be displayed again, so user can select another item.

If menu item 4 is entered, the program will be terminated.

The program should **validate the input string**. For example, if menu item 1 is selected, all characters in the string must be '0' or '1'; if item 2 is selected, all characters in the string must be hexadecimal characters ({'0', '1', '2', ... '9', 'A', 'B', ..., 'F' }). The program will ask user to re-input if the string is invalid.

▪ Submission

A runnable MIPS program.

▪ Due

04/15/2023