CSE222 Computer Architecture

Homework Set 4

1. **0x1A2B3C4D** is a hexadecimal number. Draw a picture to show how this number is stored in (a) Little-endian system; (b) Big-endian system.

**Little-endian**

|  |  |
| --- | --- |
| Address | Content |
| 100 | 4D |
| 101 | 3C |
| 102 | 2B |
| 103 | 1A |

Big-endian

|  |  |
| --- | --- |
| Address | Content |
| 100 | 1A |
| 101 | 2B |
| 102 | 3C |
| 103 | 4D |

1. Give a brief description of the following MIPS instructions. Your description should include the following information: the operation to be performed, the type of the instruction (R-, I- or J-type), and the operands (rs, rt, rd, or imm):

add $t0, $t1, $t2

Adds the values at $t1 and $t2. Then puts the sum at location $t0. The type of instruction is R. rs is $t1, rt is $t2 and rd is $t0.

lw $s0, 16($a0)

This loads the item in 16($a0) into $s0. This is I-type. Rt is $s0, imm is 16 and rs is $a0.

sw $t0, -8($t1)

This saves the item at $t0 to 8 bytes to the left of $t1.

andi $s0, $s1, 0xF0F0

srl $s1, $s2, 2

1. Write a MIPS program:
2. Generate a random number in range [-100, 100]. Display message “the random number is [number]” (replace [number] with real value). Save this number in variable(label) **vx** in memory.
3. Calculate **3x**, display result.
4. Use a **different** method to calculate **3x**, display result.
5. Find the third **different** way to calculate **3x**, display result.
6. Write a MIPS program:
7. Generate a random number in range [100, 1000]. Print out this number as a (a) decimal value; (b) hexadecimal value; (c) binary value.
8. Generate another random number in the same range. Display this number as (a) decimal; (b) hexadecimal; (c) binary
9. Find the difference between these 2 numbers. Display message “**{num1} – {num2} = {diff-value}**” (replace {num} with actual values)
10. The first number is divided by 7. Find the quotient and remainder. Display these 2 values.