CS103 – Monsoon 2018 — Homework 2

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Collaborators: NONE

1. Express the following hexadecimal number in decimal and binary forms: 0xd3fa986.

Solution: Given hexadecimal code is: d3fa986 (neglecting the hex notation 0x) We know the decimal value of the hexadeimal characters; d,f,a:

$$d = 13, f = 15, a = 10$$

The decimal value for the hexadecimal **d3fa986**:

$$(6 * 16^0) + (68 * 16^1) + (9 * 16^2) + (10 * 16^3) + (15 * 16^4) + (3 * 16^5) + (13 * 16^6)$$

$$\implies 222275974$$

Now, we have to convert decimal into binary ('r is the remainder here'):

$$= 222275974_{10}/2 - r_0$$

$$= 111137987_{10}/2 - r_1$$

$$= 55568993_{10}/2 - r_1$$

$$= 27784496_{10}/2 - r_0$$

...

...

Continuing the process until we have reached 0.

$$\implies 11010011111110101001100001 10_2$$

2. Annotate the following MIPS instructions to indicate source and destination registers. Also, describe in words (one sentence or less) what the instruction is trying to do.

(a) addi $t1, $zero, 8

Solution: Destination: $t1
Source: $zero
Instruction: To get the value of $t1 by performing the calculation of 0+8

(b) lw $s3, 4($gp) **Solution:**Destination: $s3
Source: $gp
Instruction: To get the value of 3 from the base address of 4.

(c) sw $s4, 10($s5) **Solution:**Destination: $s5
Source: $s4
Instruction: Store the value of $s4 in a specified address.