Andre Martin

CSE 140

<div align="center">Homework 1</div>

Record the name(s) of your partner(s).
Me, myself, and I. I do ask for a partner though.

How many bits does a machine instruction contain?
It contains 32-bits in a number representation.

How many types are there? What are they? Give 2 operations for each type as examples.
There is 3 types and 2 operations can be that the field specifies the operation to be performed like addition; and Address field which contains the location of the memory location

Single Accumulator:the operation is done involving a special register called the accumulator
General Register:multiple registers are used for the computation purpose.
Stack: the work on stack basis operation due to which it does not contain any address field

7.
a.- What instruction type is this? How many fields does this type of instruction have? What are the names of these fields?
The instruction is an immediate type. The instruction has four fields, the first one is source register, the second is opcode, the third is immediate, and lastly the last one is register target.

b.-what is the value of the opcode of this instruction in Hex? What register is rs? What is the value of this register in Hex? What register is rt? What is the value of this register in Hex? What immediate value is in Hex?
Opcode = 8
Immediate = 4
Rs: $t4=c

c.-Construct the machine code of line #15 using the values obtained from part b. Write your answer in both binary and Hex formats.
Hex: 0x8d0c0004
Binary: 100011   01000 01100 0000000000000100

8.
a.- What is the machine code at this address in Hex? Convert this code into binary.
Hex: 0x000d2820
Binary: 000000   00000 01101 00101 00000 100000

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b.-What is the instruction type? How can you tell? How many fields are there in this instruction type? What are the names of these fields?
The type of instruction is register due to it having 0 bits in the opcode. There are then 6 fields, opcode, shamt, rs rt, and funct.

c.- what is the value of each field in Hex?
Opcode = 0
Shamt = 0
Funct = 20
Rs = 0
Rt = D

d.- what operation is this instruction? How can you tell? What is the mapping of the registers being used in this instruction?
The operation instruction being used is add. One can then then tell since the opcode is coming out to 0 as well as a function of 20 hex.

e.- What is the final MIPS instruction? Is it the same as the Source column in the Text Segment window?
The last instruction is (add $al, $zero, $t5)

Assignment:

0x00400000
Code = 0x24020004
Hex = 001001 00000 00010 0000000000000100
a. Instruction Type: Immediate
b. Fields:
-Opcode: 9(Hex) [Add] Unsigned
-Rs = 0$zero
-Rt = 2$v0
-Immediate = 4
c. Instruction: "addiu $2, $0, 0x0000000000000004"

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0x0040002c
Code = 0x11090001
Hex = 000100 01000 01001 0000000000000001
a. Instruction Type: Immediate
b. Fields:
-Opcode: 4(Hex) [Branch] On Equal
-Rs = 8$t0
-Rt = 9$t1
Immediate = 1
c. Instruction: "beq $8, $9, 0x00000001"

0x00400030
Code = 0x08100009
Hex = 000010 000001   000000   000000   00001001
a. Instruction Type: Jump
b. Fields:
-Opcode: 2(Hex) Jump
-Address: 0x00400024
c. Instruction: "j 0x00400024"

0x00400048
 Code = 0x000a2021
Hex = 000000 00000 01010 00100 00000 100001
a. Instruction Type: Register
b. Fields:
-Opcode: 21(Hex) Addu
-Rs = 0$zero
-Rt = 10$t2
-Rd = 4$a0
-Shamt = 0
-Funct = 21
c. Instruction: "addu $4, $0, $10"