5.4 lw, sw: Load and store instructions

Load instruction: lw

A ***load instruction*** copies data from memory into a register. A MIPS load instruction format is shown below. Another sectio reason for the 0( ) around the memory-address.

```
lw register 0(memory-address)
```

MIPS register names start with a $. MIPSzy supports 8 registers. Writeable registers are $t0, $t1, ..., $t6. A special $zero reg the value 0 and can only be read, not written.

The load instruction's memory-address is a register whose value is the memory address from which data is copied.

Load word

lw is short for "load word", in contrast to just loading a byte (a word is four bytes)

PARTICIPATION ACTIVITY 5.4.1: Load instruction: lw.

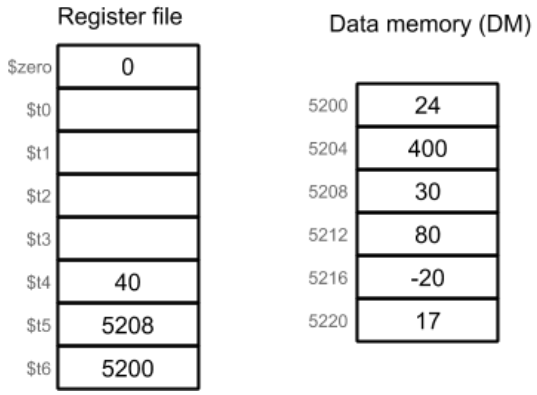
1) If $t6's value is 2020, what is the memory address for the following instruction?

```
lw $t0, 0($t6)
```

Check Show answer

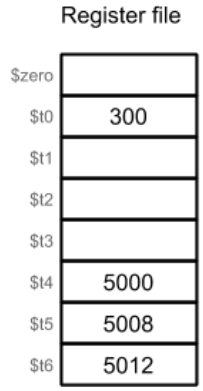
2) Given the following register file and memory contents, what value is loaded into register $t3 by the following instruction?

```
lw $t3, 0($t6)
```



Check Show answer

3) Given the following register file, complete the load instruction to load register $t2 with data at memory address 5012.




```
lw $t2, 0(     )
```

Check Show answer

4) Assuming $t5 holds 6000, write a load instruction that loads register $t4 with data at memory address 6000.

Check Show answer

Store instruction: sw

A ***store instruction*** copies data from a register to memory. A MIPS store instruction format is shown below. Another sectio reason for the 0( ) around the memory-address.

```
sw register 0(memory-address)
```

PARTICIPATION ACTIVITY 5.4.2: Store instruction: sw.

1) Assuming $t6 holds 600 and $t0 holds 5008, what is the memory address for

the following instruction?

```
sw $t6, 0($t0)
```

Check Show answer

2) Given $t2 holds 6200, $t3 holds 536, and $t4 holds 616, what value is stored into memory?

```
sw $t3, 0($t2)
```

Check Show answer

3) Given the following register file, complete the store instruction to store register $t2's value into memory at address 5000.

Register file

$zero	0
$t0	
$t1	
$t2	215
$t3	
$t4	5000
$t5	5008
$t6	5012

```
sw      , 0($t4)
```

Check Show answer

4) Assuming $t0 holds 5400 and $t1 holds 280, write a store instruction that stores register $t1's value into memory at address 5400.

Check Show answer

Instruction format summary: lw, sw

The condensed instruction format below specifies all registers using $ followed by a single character. Ex: $a.

Table 5.4.1: Instruction summary: lw, sw.

Instruction	Format	Description	Example
lw	`lw $a, 0($b)`	Load word: Copies data from memory at address $b to register $a.	`lw $t3, 0($t6)`
sw	`sw $a, 0($b)`	Store word: Copies data from register $a to memory at address $b.	`sw $t1, 0($t3)`

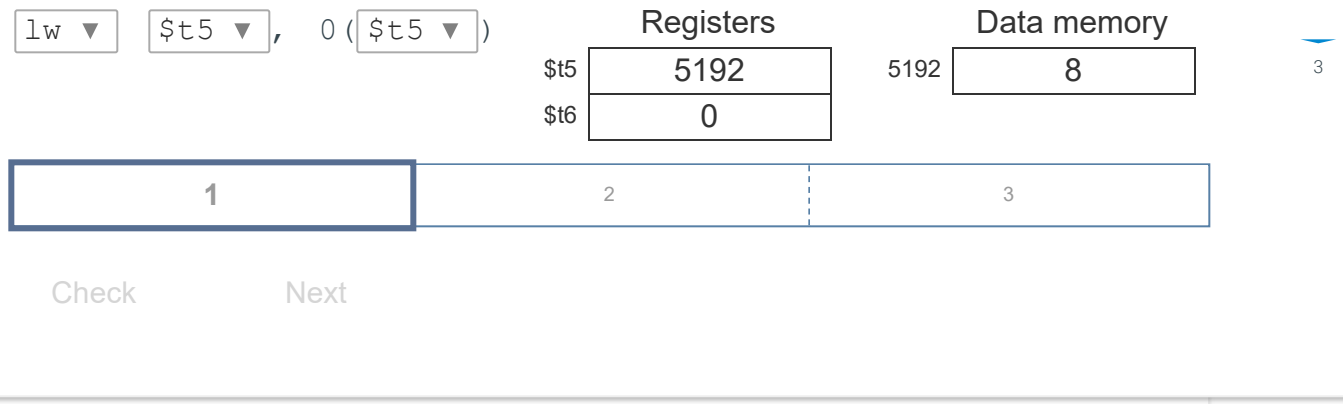
CHALLENGE ACTIVITY 5.4.1: Load and store instructions.

Start

1

Compute: $t6 = DM[5192]

2



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