## MIPS cheat sheet

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<th>Instruction</th>
<th>Syntax</th>
<th>Example</th>
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<tr>
<td>add</td>
<td>add dest, src0, src1</td>
<td>add $s0, $s1, $s2</td>
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<tr>
<td>sub</td>
<td>sub dest, src0, src1</td>
<td>sub $s0, $s1, $s2</td>
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<tr>
<td>addi</td>
<td>addi dest, src0, immediate</td>
<td>addi $s0, $s1, 12</td>
</tr>
<tr>
<td>lw</td>
<td>lw dest, offset(base addr)</td>
<td>lw $t0, 4($s0)</td>
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<tr>
<td>sw</td>
<td>sw src, offset(base addr)</td>
<td>sw $t0, 4($s0)</td>
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<tr>
<td>bne</td>
<td>bne src0, src1, branchAddr</td>
<td>bne $t0, $t1, notEq</td>
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<td>beq</td>
<td>beq src0, src1, branchAddr</td>
<td>beq $t0, $t1, Eq</td>
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<td>j</td>
<td>j jumpAddr</td>
<td>j jumpWhenDone</td>
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### C

```c
// $s0 -> a, $s1 -> b
// $s2 -> c, $s3 -> z
int a=4, b=5, c=6, z;
z = a+b+c+10;
```

```mips
addi $s0, $0, 4
addi $s1, $0, 5
addi $s2, $0, 6
addi $s3, $0, 7
add $s3, $s3, $s2
add $s3, $s3, 10
```

### MIPS

```c
// $s0 -> int *p = (int *)malloc
// (3*sizeof(int));
int a = 2;
p[0] = 0;
p[1] = a;
p[a] = a;
```

```mips
sw    $0, 0($s0)        
addiu $s1, $0, 2       
sw    $s1, 4($s0)       
sll  $t0, $s1, 2 #same as <<<
addiu $t0, $t1, $s0
sw    $s1, 0($t1)
```

### C

```c
// $s0 -> a, $s1 -> b
int a = 5, b = 10;
if (a + a == b) {
    a = 0;
} else {
    b = a - 1;
}
```

```mips
addi $s0, $0, 5
addi $s1, $0, 10
add $t0, $0, $s0
bne $t0, $s1, else
add $s0, $0, 0
j    exit
else: addi $s1, $s0, -1
exit: # done!
```

### C

```c
/*What does this do? (Not C, in English) */
Returns 2^30, or 2^N where N is the immediate on line 3
Or crash for ancient system with less than 32 bit registers (in this case, how to fix the crash?)
```

```mips
addi $s0, $0, 0
addi $s1, $0, 1
add $t0, $0, 30
loop: beq $s0, $t0, done
add $s1, $s1, $s1
add $s0, $s0, 1
j    loop
done: # done!
```
Bonus: There’s a building with 100 floors. You have 2 eggs. Assume that the eggs are of the same attributes. At the worst, how many times do you have to drop an egg off the building (count drops of both eggs) in order to determine the lowest floor at which the eggs will break? (Hint: it’s not 19)

14. Look online or ask me. Don’t feel like typing it out, lol (Basically a decimal-nary search kind of thingy)