

ADD – Add (with overflow)

Operation: $\$d = \$s + \$t;$
`advance_pc (4);`
Syntax: `add $d, $s, $t`
Encoding: 0000 00ss ssst
tttt dddd d000 0010 0000

AND -- Bitwise and

Operation: $\$d = \$s \& \$t;$
`advance_pc (4);`
Syntax: `and $d, $s, $t`
Encoding: 0000 00ss ssst
tttt dddd d000 0010 0100

BGEZAL -- Branch on greater than or

equal to zero and link
Operation: if $\$s >= 0$ \$31
= PC + 8 (or nPC + 4);
`advance_pc (offset << 2));`
`else advance_pc (4);`
Syntax: `bgezal $s, offset`
Encoding: 0000 01ss sss1
0001 iiiii iiiii iiiii iiiii

BLTZAL -- Branch on less than zero and link

Operation: if $\$s < 0$ \$31 =
PC + 8 (or nPC + 4);
`advance_pc (offset << 2));`
`else advance_pc (4);`
Syntax: `bltzal $s, offset`
Encoding: 0000 01ss sss1
0000 iiiii iiiii iiiii iiiii

ADDI -- Add immediate (with overflow)

Operation: $\$t = \$s + imm;$
`advance_pc (4);`
Syntax: `addi $t, $s, imm`
Encoding: 0010 00ss ssst
tttt iiiii iiiii iiiii iiiii

ANDI -- Bitwise and immediate

Operation: $\$t = \$s \& imm;$
`advance_pc (4);`
Syntax: `andi $t, $s, imm`
Encoding: 0011 00ss ssst
tttt iiiii iiiii iiiii iiiii

BGTZ -- Branch on greater than zero

Operation: if $\$s > 0$
`advance_pc (offset << 2));`
`else advance_pc (4);`
Syntax: `bgtz $s, offset`
Encoding: 0001 11ss sss0
0000 iiiii iiiii iiiii iiiii

BLTZAL -- Branch on less than zero and link

Operation: if $\$s < 0$ \$31 =
PC + 8 (or nPC + 4);
`advance_pc (offset << 2));`
`else advance_pc (4);`
Syntax: `bltzal $s, offset`
Encoding: 0000 01ss sss1
0000 iiiii iiiii iiiii iiiii

ADDIU -- Add immediate unsigned (no overflow)

Operation: $\$t = \$s + imm;$
`advance_pc (4);`
Syntax: `addiu $t, $s, imm`
Encoding: 0010 01ss ssst
tttt iiiii iiiii iiiii iiiii

ANDI -- Bitwise and immediate

Operation: $\$t = \$s \& imm;$
`advance_pc (4);`
Syntax: `andi $t, $s, imm`
Encoding: 0011 00ss ssst
tttt iiiii iiiii iiiii iiiii

BEQ -- Branch on equal

Operation: if $\$s == \t
`advance_pc (offset << 2));`
`else advance_pc (4);`
Syntax: `beq $s, $t, offset`
Encoding: 0001 00ss ssst
tttt iiiii iiiii iiiii iiiii

BLEZ -- Branch on less than or equal to zero

Operation: if $\$s \leq 0$
`advance_pc (offset << 2));`
`else advance_pc (4);`
Syntax: `blez $s, offset`
Encoding: 0001 10ss sss0
0000 iiiii iiiii iiiii iiiii

BLTZ -- Branch on less than zero

Operation: if $\$s < 0$
`advance_pc (offset << 2));`
`else advance_pc (4);`
Syntax: `bltz $s, offset`
Encoding: 0000 01ss sss0
0000 iiiii iiiii iiiii iiiii

ADDIU -- Add immediate unsigned (no overflow)

Operation: $\$t = \$s + imm;$
`advance_pc (4);`
Syntax: `addiu $t, $s, imm`
Encoding: 0010 01ss ssst
tttt iiiii iiiii iiiii iiiii

BGEZ -- Branch on greater than or equal to zero

Operation: if $\$s \geq 0$
`advance_pc (offset << 2));`
`else advance_pc (4);`
Syntax: `bgez $s, offset`
Encoding: 0000 01ss sss0
0001 iiiii iiiii iiiii iiiii



By skung

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Not published yet.

Last updated 25th September, 2018.

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