# MIPS Register-Usage Conventions

Special hardware roles:

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|---|---|
| $0 | - hardwired to always contain 0 |
| $31 | - return address from a procedure - always set by `jal`. |

Registers to avoid using

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|---|---|
| $1 | - assembler temporary.  The assembler may convert user-written memory reference and jump instructions to two instruction sequences using this, so use this very carefully (if at all) |
| $26, $27 | - used  by operating system kernel, so may change unpredictably when an interrupt occurs.  **Therefore, user programs should not use these**. |

Caller-save registers

| | |
|---|---|
| $2, $3 | - return value from procedures. |
| $4-$7 or $4-$11 | - parameters to procedures (two different conventions). |
| $8-$15 or $12-$15 | - temporaries (depending on which parameter convention is used). |
| $24-25 | - temporaries |

Callee-save registers

| | |
|---|---|
| $16-$23 | - temporaries. |
| $28 ($gp) | - points to global variable storage area in memory. |
| $29 ($sp) | - stack pointer. (Follows special conventions - decrement at procedure entry; increment by same amount at exit; value must only change by a multiple of 16) |
| $30 ($fp) | - points to stack frame for current procedure; if not used for this purpose, a procedure may use this for any purpose. |