|  |  |  |  |
| --- | --- | --- | --- |
| Symbol | Name | Excluded | Included |
| L | Limit | 3 | 2 |
| O | Opposition | No | Yes |
| R | Random | Zeros | Gaussian |
| D | Discount | 0.999 | (0.99, 100) |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Single Q-Learning | | | | | | | | |
| Combination | Mean | S.T.D | Median | I.Q.R | Max | Min | Failed | Difference |
| None | | | | | | | | |
| - | 293.87 | 36.64 | 286.5 | 43.0 | 414 | 252 | 0 | 0 |
| One | | | | | | | | |
| L | 268.47 | 29.96 | 260.0 | 23.0 | 359 | 237 | 0 | 4.73 |
| R | 286.70 | 30.39 | 278.0 | 41.0 | 360 | 244 | 0 | 0 |
| D | 297.63 | 46.78 | 274.5 | 72.0 | 443 | 242 | 0 | 0 |
| O | - | - | - | - | - | - | - | - |
| Two | | | | | | | | |
| L + D | 266.87 | 29.70 | 259.5 | 20.0 | 384 | 235 | 0 | 6.40 |
| L + R | 270.67 | 32.62 | 259.0 | 32.0 | 369 | 236 | 0 | 1.77 |
| D + R | 303.80 | 36.48 | 300.0 | 39.0 | 398 | 255 | 0 | 0 |
| O + D | - | - | - | - | - | - | - | - |
| O + R | - | - | - | - | - | - | - | - |
| L + O | - | - | - | - | - | - | - | - |
| Three | | | | | | | | |
| L + D + R | 274.57 | 41.31 | 263.5 | 29.0 | 443 | 243 | 0 | 0 |
| L + O + D | - | - | - | - | - | - | - | - |
| L + O + R | - | - | - | - | - | - | - | - |
| O + D + R | - | - | - | - | - | - | - | - |
| Four | | | | | | | | |
| L + O + D + R | - | - | - | - | - | - | - | - |

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| Double Q-Learning | | | | | | | | |
| Combination | Mean | S.T.D | Median | I.Q.R | Max | Min | Failed | Difference |
| None | | | | | | | | |
| - | 258.03 | 16.76 | 259.0 | 21.0 | 302 | 233 | 2 | 18.24 |
| One | | | | | | | | |
| L | 243.83 | 17.35 | 245.0 | 26.0 | 293 | 214 | 1 | 32.33 |
| D | 274.63 | 54.31 | 257.0 | 40.0 | 478 | 219 | 0 | 0 |
| R | 283.13 | 56.42 | 268.0 | 43.0 | 481 | 225 | 2 | 0 |
| O | - | - | - | - | - | - | - | - |
| Two | | | | | | | | |
| L + D | 250.43 | 22.90 | 245.5 | 20.0 | 322 | 219 | 0 | 24.57 |
| L + R | 263.13 | 49.91 | 244.5 | 32.0 | 430 | 224 | 1 | 3.70 |
| D + R | 277.57 | 41.34 | 263.5 | 38.0 | 395 | 224 | 2 | 0 |
| O + D | - | - | - | - | - | - | - | - |
| O + R | - | - | - | - | - | - | - | - |
| L + O | - | - | - | - | - | - | - | - |
| Three | | | | | | | | |
| L + D + R | 270.80 | 67.56 | 247.0 | 42.0 | 500 | 225 | 0 | 0 |
| L + O + D | - | - | - | - | - | - | - | - |
| L + O + R | - | - | - | - | - | - | - | - |
| O + D + R | - | - | - | - | - | - | - | - |
| Four | | | | | | | | |
| L + O + D + R | - | - | - | - | - | - | - | - |

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| Triple Q-Learning | | | | | | | | |
| Combination | Mean | S.T.D | Median | I.Q.R | Max | Min | Failed | Difference |
| None | | | | | | | | |
| - | 286.97 | 67.94 | 262.0 | 68.0 | 496 | 226 | 3 | 0 |
| One | | | | | | | | |
| R | 263.93 | 37.28 | 251.5 | 37.0 | 414 | 227 | 2 | 7.11 |
| L | 257.60 | 66.80 | 238.5 | 26.0 | 466 | 210 | 2 | 2.99 |
| D | 278.47 | 48.87 | 263.0 | 45.0 | 428 | 227 | 2 | 0 |
| O | - | - | - | - | - | - | - | - |
| Two | | | | | | | | |
| L + D | 245.97 | 39.84 | 234.0 | 22.0 | 417 | 213 | 1 | 24.26 |
| L + R | 244.37 | 50.33 | 232.0 | 19.0 | 500 | 217 | 0 | 22.31 |
| D + R | 270.83 | 49.80 | 258.0 | 36.0 | 479 | 229 | 1 | 0 |
| L + O | - | - | - | - | - | - | - | - |
| O + D | - | - | - | - | - | - | - | - |
| O + R | - | - | - | - | - | - | - | - |
| Three | | | | | | | | |
| L + D + R | 236.90 | 17.40 | 234.5 | 17.0 | 291 | 216 | 1 | 39.25 |
| L + O + D | - | - | - | - | - | - | - | - |
| L + O + R | - | - | - | - | - | - | - | - |
| O + D + R | - | - | - | - | - | - | - | - |
| Four | | | | | | | | |
| L + O + D + R | - | - | - | - | - | - | - | - |

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| Quadruple Q-Learning | | | | | | | | |
| Combination | Mean | S.T.D | Median | I.Q.R | Max | Min | Failed | Difference |
| None | | | | | | | | |
| - | 263.23 | 51.20 | 250.0 | 53.0 | 491 | 216 | 4 | 3.14 |
| One | | | | | | | | |
| L | 233.00 | 38.63 | 226.0 | 18.0 | 428 | 207 | 0 | 37.61 |
| R | 247.20 | 25.84 | 240.5 | 32.0 | 342 | 212 | 2 | 27.09 |
| D | 266.73 | 34.05 | 264.0 | 62.0 | 353 | 222 | 1 | 5.29 |
| O | - | - | - | - | - | - | - | - |
| Two | | | | | | | | |
| L + D | 232.97 | 23.27 | 223.5 | 23.0 | 308 | 209 | 1 | 41.94 |
| L + R | 235.00 | 32.52 | 225.5 | 34.0 | 358 | 200 | 0 | 37.47 |
| D + R | 260.53 | 28.06 | 258.5 | 38.0 | 318 | 221 | 2 | 13.18 |
| O + D | - | - | - | - | - | - | - | - |
| O + R | - | - | - | - | - | - | - | - |
| L + O | - | - | - | - | - | - | - | - |
| Three | | | | | | | | |
| L + D + R | 241.37 | 41.27 | 232.0 | 23.0 | 423 | 210 | 0 | 28.39 |
| L + O + R | - | - | - | - | - | - | - | - |
| L + O + D | - | - | - | - | - | - | - | - |
| O + D + R | - | - | - | - | - | - | - | - |
| Four | | | | | | | | |
| L + O + D + R | - | - | - | - | - | - | - | - |

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| Quintuple Q-Learning | | | | | | | | |
| Combination | Mean | S.T.D | Median | I.Q.R | Max | Min | Failed | Difference |
| None | | | | | | | | |
| - | 251.47 | 34.26 | 243.5 | 40.0 | 343 | 213 | 4 | 20.49 |
| One | | | | | | | | |
| L | 222.37 | 10.50 | 221.5 | 12.0 | 261 | 208 | 0 | 54.85 |
| R | 250.70 | 26.15 | 242.5 | 41.0 | 318 | 221 | 2 | 23.51 |
| D | 258.30 | 43.75 | 255.0 | 35.0 | 450 | 212 | 0 | 10.64 |
| O | - | - | - | - | - | - | - | - |
| Two | | | | | | | | |
| L + D | 228.77 | 19.21 | 225.5 | 18.0 | 285 | 202 | 1 | 47.03 |
| L + R | 233.30 | 52.16 | 225.5 | 21.0 | 495 | 202 | 1 | 32.73 |
| D + R | 249.80 | 25.25 | 249.5 | 35.0 | 299 | 211 | 1 | 24.63 |
| O + D | - | - | - | - | - | - | - | - |
| O + R | - | - | - | - | - | - | - | - |
| L + O | - | - | - | - | - | - | - | - |
| Three | | | | | | | | |
| L + D + R | 222.67 | 10.28 | 223.0 | 14.0 | 250 | 206 | 0 | 54.58 |
| L + O + R | - | - | - | - | - | - | - | - |
| L + O + D | - | - | - | - | - | - | - | - |
| O + D + R | - | - | - | - | - | - | - | - |
| Four | | | | | | | | |
| L + O + D + R | - | - | - | - | - | - | - | - |