

# Table of Linear Feedback Shift Registers

Roy Ward, Tim Molteno\*

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Here is a table of maximum-cycle Linear Feedback Shift Register (LFSR) taps. The bit numbering starts from  $n \dots 1$  with  $n$  being the input bit and 1 the output bit. Figure 1 shows an 8-stage maximum-cycle LFSR. LFSR-2 refers to two tap LFSRs, LFSR-4 to LFSRs. Blanks indicate no solution exists.

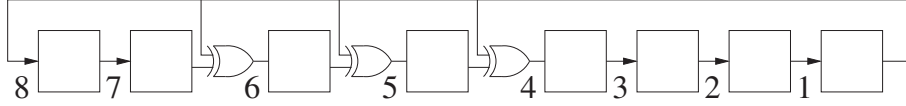


Figure 1: An 8-stage Galois LFSR with cycle size 255. This LFSR has taps at positions 8,6,5 and 4.

Table 1: Shift Registers with Cycle Size  $2^n - 1$

| $n$ | LFSR-2 | LFSR-4         | $n$ | LFSR-2 | LFSR-4         | $n$ | LFSR-2 | LFSR-4         |
|-----|--------|----------------|-----|--------|----------------|-----|--------|----------------|
| 2   | 2, 1   |                | 24  |        | 24, 23, 21, 20 | 46  |        | 46, 40, 39, 38 |
| 3   | 3, 2   |                | 25  | 25, 22 | 25, 24, 23, 22 | 47  | 47, 42 | 47, 46, 43, 42 |
| 4   | 4, 3   |                | 26  |        | 26, 25, 24, 20 | 48  |        | 48, 44, 41, 39 |
| 5   | 5, 3   | 5, 4, 3, 2     | 27  |        | 27, 26, 25, 22 | 49  | 49, 40 | 49, 45, 44, 43 |
| 6   | 6, 5   | 6, 5, 3, 2     | 28  | 28, 25 | 28, 27, 24, 22 | 50  |        | 50, 48, 47, 46 |
| 7   | 7, 6   | 7, 6, 5, 4     | 29  | 29, 27 | 29, 28, 27, 25 | 51  |        | 51, 50, 48, 45 |
| 8   |        | 8, 6, 5, 4     | 30  |        | 30, 29, 26, 24 | 52  | 52, 49 | 52, 51, 49, 46 |
| 9   | 9, 5   | 9, 8, 6, 5     | 31  | 31, 28 | 31, 30, 29, 28 | 53  |        | 53, 52, 51, 47 |
| 10  | 10, 7  | 10, 9, 7, 6    | 32  |        | 32, 30, 26, 25 | 54  |        | 54, 51, 48, 46 |
| 11  | 11, 9  | 11, 10, 9, 7   | 33  | 33, 20 | 33, 32, 29, 27 | 55  | 55, 31 | 55, 54, 53, 49 |
| 12  |        | 12, 11, 8, 6   | 34  |        | 34, 31, 30, 26 | 56  |        | 56, 54, 52, 49 |
| 13  |        | 13, 12, 10, 9  | 35  | 35, 33 | 35, 34, 28, 27 | 57  | 57, 50 | 57, 55, 54, 52 |
| 14  |        | 14, 13, 11, 9  | 36  | 36, 25 | 36, 35, 29, 28 | 58  | 58, 39 | 58, 57, 53, 52 |
| 15  | 15, 14 | 15, 14, 13, 11 | 37  |        | 37, 36, 33, 31 | 59  |        | 59, 57, 55, 52 |
| 16  |        | 16, 14, 13, 11 | 38  |        | 38, 37, 33, 32 | 60  | 60, 59 | 60, 58, 56, 55 |
| 17  | 17, 14 | 17, 16, 15, 14 | 39  | 39, 35 | 39, 38, 35, 32 | 61  |        | 61, 60, 59, 56 |
| 18  | 18, 11 | 18, 17, 16, 13 | 40  |        | 40, 37, 36, 35 | 62  |        | 62, 59, 57, 56 |
| 19  |        | 19, 18, 17, 14 | 41  | 41, 38 | 41, 40, 39, 38 | 63  | 63, 62 | 63, 62, 59, 58 |
| 20  | 20, 17 | 20, 19, 16, 14 | 42  |        | 42, 40, 37, 35 | 64  |        | 64, 63, 61, 60 |
| 21  | 21, 19 | 21, 20, 19, 16 | 43  |        | 43, 42, 38, 37 | 65  | 65, 47 | 65, 64, 62, 61 |
| 22  | 22, 21 | 22, 19, 18, 17 | 44  |        | 44, 42, 39, 38 | 66  |        | 66, 60, 58, 57 |
| 23  | 23, 18 | 23, 22, 20, 18 | 45  |        | 45, 44, 42, 41 | 67  |        | 67, 66, 65, 62 |

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\*Department of Physics, University of Otago, Box 56, Dunedin, New Zealand

| $n$ | LFSR-2   | LFSR-4             | $n$ | LFSR-2   | LFSR-4             | $n$ | LFSR-2   | LFSR-4             |
|-----|----------|--------------------|-----|----------|--------------------|-----|----------|--------------------|
| 68  | 68, 59   | 68, 67, 63, 61     | 120 |          | 120, 118, 114, 111 | 172 | 172, 165 | 172, 169, 165, 161 |
| 69  |          | 69, 67, 64, 63     | 121 | 121, 103 | 121, 120, 116, 113 | 173 |          | 173, 171, 168, 165 |
| 70  |          | 70, 69, 67, 65     | 122 |          | 122, 121, 120, 116 | 174 | 174, 161 | 174, 169, 166, 165 |
| 71  | 71, 65   | 71, 70, 68, 66     | 123 | 123, 121 | 123, 122, 119, 115 | 175 | 175, 169 | 175, 173, 171, 169 |
| 72  |          | 72, 69, 63, 62     | 124 | 124, 87  | 124, 119, 118, 117 | 176 |          | 176, 167, 165, 164 |
| 73  | 73, 48   | 73, 71, 70, 69     | 125 |          | 125, 120, 119, 118 | 177 | 177, 169 | 177, 175, 174, 172 |
| 74  |          | 74, 71, 70, 67     | 126 |          | 126, 124, 122, 119 | 178 | 178, 91  | 178, 176, 171, 170 |
| 75  |          | 75, 74, 72, 69     | 127 | 127, 126 | 127, 126, 124, 120 | 179 |          | 179, 178, 177, 175 |
| 76  |          | 76, 74, 72, 71     | 128 |          | 128, 127, 126, 121 | 180 |          | 180, 173, 170, 168 |
| 77  |          | 77, 75, 72, 71     | 129 | 129, 124 | 129, 128, 125, 124 | 181 |          | 181, 180, 175, 174 |
| 78  |          | 78, 77, 76, 71     | 130 | 130, 127 | 130, 129, 128, 125 | 182 |          | 182, 181, 176, 174 |
| 79  | 79, 70   | 79, 77, 76, 75     | 131 |          | 131, 129, 128, 123 | 183 | 183, 127 | 183, 179, 176, 175 |
| 80  |          | 80, 78, 76, 71     | 132 | 132, 103 | 132, 130, 127, 123 | 184 |          | 184, 177, 176, 175 |
| 81  | 81, 77   | 81, 79, 78, 75     | 133 |          | 133, 131, 125, 124 | 185 | 185, 161 | 185, 184, 182, 177 |
| 82  |          | 82, 78, 76, 73     | 134 | 134, 77  | 134, 133, 129, 127 | 186 |          | 186, 180, 178, 177 |
| 83  |          | 83, 81, 79, 76     | 135 | 135, 124 | 135, 132, 131, 129 | 187 |          | 187, 182, 181, 180 |
| 84  | 84, 71   | 84, 83, 77, 75     | 136 |          | 136, 134, 133, 128 | 188 |          | 188, 186, 183, 182 |
| 85  |          | 85, 84, 83, 77     | 137 | 137, 116 | 137, 136, 133, 126 | 189 |          | 189, 187, 184, 183 |
| 86  |          | 86, 84, 81, 80     | 138 |          | 138, 137, 131, 130 | 190 |          | 190, 188, 184, 177 |
| 87  | 87, 74   | 87, 86, 82, 80     | 139 |          | 139, 136, 134, 131 | 191 | 191, 182 | 191, 187, 185, 184 |
| 88  |          | 88, 80, 79, 77     | 140 | 140, 111 | 140, 139, 136, 132 | 192 |          | 192, 190, 178, 177 |
| 89  | 89, 51   | 89, 86, 84, 83     | 141 |          | 141, 140, 135, 128 | 193 | 193, 178 | 193, 189, 186, 184 |
| 90  |          | 90, 88, 87, 85     | 142 | 142, 121 | 142, 141, 139, 132 | 194 | 194, 107 | 194, 192, 191, 190 |
| 91  |          | 91, 90, 86, 83     | 143 |          | 143, 141, 140, 138 | 195 |          | 195, 193, 192, 187 |
| 92  |          | 92, 90, 87, 86     | 144 |          | 144, 142, 140, 137 | 196 |          | 196, 194, 187, 185 |
| 93  | 93, 91   | 93, 91, 90, 87     | 145 | 145, 93  | 145, 144, 140, 139 | 197 |          | 197, 195, 193, 188 |
| 94  | 94, 73   | 94, 93, 89, 88     | 146 |          | 146, 144, 143, 141 | 198 | 198, 133 | 198, 193, 190, 183 |
| 95  | 95, 84   | 95, 94, 90, 88     | 147 |          | 147, 145, 143, 136 | 199 | 199, 165 | 199, 198, 195, 190 |
| 96  |          | 96, 90, 87, 86     | 148 | 148, 121 | 148, 145, 143, 141 | 200 |          | 200, 198, 197, 195 |
| 97  | 97, 91   | 97, 95, 93, 91     | 149 |          | 149, 142, 140, 139 | 201 | 201, 187 | 201, 199, 198, 195 |
| 98  | 98, 87   | 98, 97, 91, 90     | 150 | 150, 97  | 150, 148, 147, 142 | 202 | 202, 147 | 202, 198, 196, 195 |
| 99  |          | 99, 95, 94, 92     | 151 | 151, 148 | 151, 150, 149, 148 | 203 |          | 203, 202, 196, 195 |
| 100 | 100, 63  | 100, 98, 93, 92    | 152 |          | 152, 150, 149, 146 | 204 |          | 204, 201, 200, 194 |
| 101 |          | 101, 100, 95, 94   | 153 | 153, 152 | 153, 149, 148, 145 | 205 |          | 205, 203, 200, 196 |
| 102 |          | 102, 99, 97, 96    | 154 |          | 154, 153, 149, 145 | 206 |          | 206, 201, 197, 196 |
| 103 | 103, 94  | 103, 102, 99, 94   | 155 |          | 155, 151, 150, 148 | 207 | 207, 164 | 207, 206, 201, 198 |
| 104 |          | 104, 103, 94, 93   | 156 |          | 156, 153, 151, 147 | 208 |          | 208, 207, 205, 199 |
| 105 | 105, 89  | 105, 104, 99, 98   | 157 |          | 157, 155, 152, 151 | 209 | 209, 203 | 209, 207, 206, 204 |
| 106 | 106, 91  | 106, 105, 101, 100 | 158 |          | 158, 153, 152, 150 | 210 |          | 210, 207, 206, 198 |
| 107 |          | 107, 105, 99, 98   | 159 | 159, 128 | 159, 156, 153, 148 | 211 |          | 211, 203, 201, 200 |
| 108 | 108, 77  | 108, 103, 97, 96   | 160 |          | 160, 158, 157, 155 | 212 | 212, 107 | 212, 209, 208, 205 |
| 109 |          | 109, 107, 105, 104 | 161 | 161, 143 | 161, 159, 158, 155 | 213 |          | 213, 211, 208, 207 |
| 110 |          | 110, 109, 106, 104 | 162 |          | 162, 158, 155, 154 | 214 |          | 214, 213, 211, 209 |
| 111 | 111, 101 | 111, 109, 107, 104 | 163 |          | 163, 160, 157, 156 | 215 | 215, 192 | 215, 212, 210, 209 |
| 112 |          | 112, 108, 106, 101 | 164 |          | 164, 159, 158, 152 | 216 |          | 216, 215, 213, 209 |
| 113 | 113, 104 | 113, 111, 110, 108 | 165 |          | 165, 162, 157, 156 | 217 | 217, 172 | 217, 213, 212, 211 |
| 114 |          | 114, 113, 112, 103 | 166 |          | 166, 164, 163, 156 | 218 | 218, 207 | 218, 217, 211, 210 |
| 115 |          | 115, 110, 108, 107 | 167 | 167, 161 | 167, 165, 163, 161 | 219 |          | 219, 218, 215, 211 |
| 116 |          | 116, 114, 111, 110 | 168 |          | 168, 162, 159, 152 | 220 |          | 220, 211, 210, 208 |
| 117 |          | 117, 116, 115, 112 | 169 | 169, 135 | 169, 164, 163, 161 | 221 |          | 221, 219, 215, 213 |
| 118 | 118, 85  | 118, 116, 113, 112 | 170 | 170, 147 | 170, 169, 166, 161 | 222 |          | 222, 220, 217, 214 |
| 119 | 119, 111 | 119, 116, 111, 110 | 171 |          | 171, 169, 166, 165 | 223 | 223, 190 | 223, 221, 219, 218 |

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| $n$ | LFSR-2   | LFSR-4             | $n$ | LFSR-2   | LFSR-4             | $n$ | LFSR-2   | LFSR-4             |
|-----|----------|--------------------|-----|----------|--------------------|-----|----------|--------------------|
| 224 |          | 224, 222, 217, 212 | 276 |          | 276, 275, 273, 270 | 328 |          | 328, 323, 321, 319 |
| 225 | 225, 193 | 225, 224, 220, 215 | 277 |          | 277, 274, 271, 265 | 329 | 329, 279 | 329, 326, 323, 321 |
| 226 |          | 226, 223, 219, 216 | 278 | 278, 273 | 278, 277, 274, 273 | 330 |          | 330, 328, 323, 322 |
| 227 |          | 227, 223, 218, 217 | 279 | 279, 274 | 279, 278, 275, 274 | 331 |          | 331, 329, 325, 321 |
| 228 |          | 228, 226, 217, 216 | 280 |          | 280, 278, 275, 271 | 332 | 332, 209 | 332, 325, 321, 320 |
| 229 |          | 229, 228, 225, 219 | 281 | 281, 188 | 281, 280, 277, 272 | 333 | 333, 331 | 333, 331, 329, 325 |
| 230 |          | 230, 224, 223, 222 | 282 | 282, 247 | 282, 278, 277, 272 | 334 |          | 334, 333, 330, 327 |
| 231 | 231, 205 | 231, 229, 227, 224 | 283 |          | 283, 278, 276, 271 | 335 |          | 335, 333, 328, 325 |
| 232 |          | 232, 228, 223, 221 | 284 | 284, 165 | 284, 279, 278, 276 | 336 |          | 336, 335, 332, 329 |
| 233 | 233, 159 | 233, 232, 229, 224 | 285 |          | 285, 280, 278, 275 | 337 | 337, 282 | 337, 336, 331, 327 |
| 234 | 234, 203 | 234, 232, 225, 223 | 286 | 286, 217 | 286, 285, 276, 271 | 338 |          | 338, 336, 335, 332 |
| 235 |          | 235, 234, 229, 226 | 287 | 287, 216 | 287, 285, 282, 281 | 339 |          | 339, 332, 329, 323 |
| 236 | 236, 231 | 236, 229, 228, 226 | 288 |          | 288, 287, 278, 277 | 340 |          | 340, 337, 336, 329 |
| 237 |          | 237, 236, 233, 230 | 289 | 289, 268 | 289, 286, 285, 277 | 341 |          | 341, 336, 330, 327 |
| 238 |          | 238, 237, 236, 233 | 290 |          | 290, 288, 287, 285 | 342 | 342, 217 | 342, 341, 340, 331 |
| 239 | 239, 203 | 239, 238, 232, 227 | 291 |          | 291, 286, 280, 279 | 343 | 343, 268 | 343, 338, 335, 333 |
| 240 |          | 240, 237, 235, 232 | 292 | 292, 195 | 292, 291, 289, 285 | 344 |          | 344, 338, 334, 333 |
| 241 | 241, 171 | 241, 237, 233, 232 | 293 |          | 293, 292, 287, 282 | 345 | 345, 323 | 345, 343, 341, 337 |
| 242 |          | 242, 241, 236, 231 | 294 | 294, 233 | 294, 292, 291, 285 | 346 |          | 346, 344, 339, 335 |
| 243 |          | 243, 242, 238, 235 | 295 | 295, 247 | 295, 293, 291, 290 | 347 |          | 347, 344, 337, 336 |
| 244 |          | 244, 243, 240, 235 | 296 |          | 296, 292, 287, 285 | 348 |          | 348, 344, 341, 340 |
| 245 |          | 245, 244, 241, 239 | 297 | 297, 292 | 297, 296, 293, 292 | 349 |          | 349, 347, 344, 343 |
| 246 |          | 246, 245, 244, 235 | 298 |          | 298, 294, 290, 287 | 350 | 350, 297 | 350, 340, 337, 336 |
| 247 | 247, 165 | 247, 245, 243, 238 | 299 |          | 299, 295, 293, 288 | 351 | 351, 317 | 351, 348, 345, 343 |
| 248 |          | 248, 238, 234, 233 | 300 | 300, 293 | 300, 290, 288, 287 | 352 |          | 352, 346, 341, 339 |
| 249 | 249, 163 | 249, 248, 245, 242 | 301 |          | 301, 299, 296, 292 | 353 | 353, 284 | 353, 349, 346, 344 |
| 250 | 250, 147 | 250, 247, 245, 240 | 302 | 302, 261 | 302, 297, 293, 290 | 354 |          | 354, 349, 341, 340 |
| 251 |          | 251, 249, 247, 244 | 303 |          | 303, 297, 291, 290 | 355 |          | 355, 354, 350, 349 |
| 252 | 252, 185 | 252, 251, 247, 241 | 304 |          | 304, 303, 302, 293 | 356 |          | 356, 349, 347, 346 |
| 253 |          | 253, 252, 247, 246 | 305 | 305, 203 | 305, 303, 299, 298 | 357 |          | 357, 355, 347, 346 |
| 254 |          | 254, 253, 252, 247 | 306 |          | 306, 305, 303, 299 | 358 |          | 358, 351, 350, 344 |
| 255 | 255, 203 | 255, 253, 252, 250 | 307 |          | 307, 305, 303, 299 | 359 | 359, 291 | 359, 358, 352, 350 |
| 256 |          | 256, 254, 251, 246 | 308 |          | 308, 306, 299, 293 | 360 |          | 360, 359, 335, 334 |
| 257 | 257, 245 | 257, 255, 251, 250 | 309 |          | 309, 307, 302, 299 | 361 |          | 361, 360, 357, 354 |
| 258 | 258, 175 | 258, 254, 252, 249 | 310 |          | 310, 309, 305, 302 | 362 | 362, 299 | 362, 360, 351, 344 |
| 259 |          | 259, 257, 253, 249 | 311 |          | 311, 308, 306, 304 | 363 |          | 363, 362, 356, 355 |
| 260 |          | 260, 253, 252, 250 | 312 |          | 312, 307, 302, 301 | 364 | 364, 297 | 364, 363, 359, 352 |
| 261 |          | 261, 257, 255, 254 | 313 | 313, 234 | 313, 312, 310, 306 | 365 |          | 365, 360, 359, 356 |
| 262 |          | 262, 258, 254, 253 | 314 | 314, 299 | 314, 311, 305, 300 | 366 | 366, 337 | 366, 362, 359, 352 |
| 263 | 263, 170 | 263, 261, 258, 252 | 315 |          | 315, 314, 306, 305 | 367 | 367, 346 | 367, 365, 363, 358 |
| 264 |          | 264, 263, 255, 254 | 316 | 316, 181 | 316, 309, 305, 304 | 368 |          | 368, 361, 359, 351 |
| 265 | 265, 223 | 265, 263, 262, 260 | 317 |          | 317, 315, 313, 310 | 369 | 369, 278 | 369, 367, 359, 358 |
| 266 | 266, 219 | 266, 265, 260, 259 | 318 |          | 318, 313, 312, 310 | 370 | 370, 231 | 370, 368, 367, 365 |
| 267 |          | 267, 264, 261, 259 | 319 | 319, 283 | 319, 318, 317, 308 | 371 |          | 371, 369, 368, 363 |
| 268 | 268, 243 | 268, 267, 264, 258 | 320 |          | 320, 319, 317, 316 | 372 |          | 372, 369, 365, 357 |
| 269 |          | 269, 268, 263, 262 | 321 | 321, 290 | 321, 319, 316, 314 | 373 |          | 373, 371, 366, 365 |
| 270 | 270, 217 | 270, 267, 263, 260 | 322 | 322, 255 | 322, 321, 320, 305 | 374 |          | 374, 369, 368, 366 |
| 271 | 271, 213 | 271, 265, 264, 260 | 323 |          | 323, 322, 320, 313 | 375 | 375, 359 | 375, 374, 368, 367 |
| 272 |          | 272, 270, 266, 263 | 324 |          | 324, 321, 320, 318 | 376 |          | 376, 371, 369, 368 |
| 273 | 273, 250 | 273, 272, 271, 266 | 325 |          | 325, 323, 320, 315 | 377 | 377, 336 | 377, 376, 374, 369 |
| 274 | 274, 207 | 274, 272, 267, 265 | 326 |          | 326, 325, 323, 316 | 378 | 378, 335 | 378, 374, 365, 363 |
| 275 |          | 275, 266, 265, 264 | 327 | 327, 293 | 327, 325, 322, 319 | 379 |          | 379, 375, 370, 369 |

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| $n$ | LFSR-2   | LFSR-4             | $n$ | LFSR-2   | LFSR-4             | $n$ | LFSR-2   | LFSR-4             |
|-----|----------|--------------------|-----|----------|--------------------|-----|----------|--------------------|
| 380 | 380, 333 | 380, 377, 374, 366 | 432 |          | 432, 429, 428, 419 | 484 | 484, 379 | 484, 483, 482, 470 |
| 381 |          | 381, 380, 379, 376 | 433 | 433, 400 | 433, 430, 428, 422 | 485 |          | 485, 479, 469, 468 |
| 382 | 382, 301 | 382, 379, 375, 364 | 434 |          | 434, 429, 423, 422 | 486 |          | 486, 481, 478, 472 |
| 383 | 383, 293 | 383, 382, 378, 374 | 435 |          | 435, 430, 426, 423 | 487 | 487, 393 | 487, 485, 483, 478 |
| 384 |          | 384, 378, 369, 368 | 436 | 436, 271 | 436, 432, 431, 430 | 488 |          | 488, 487, 485, 484 |
| 385 | 385, 379 | 385, 383, 381, 379 | 437 |          | 437, 436, 435, 431 | 489 | 489, 406 | 489, 484, 483, 480 |
| 386 | 386, 303 | 386, 381, 380, 376 | 438 | 438, 373 | 438, 436, 432, 421 | 490 | 490, 271 | 490, 485, 483, 481 |
| 387 |          | 387, 385, 379, 378 | 439 | 439, 390 | 439, 437, 436, 431 | 491 |          | 491, 488, 485, 480 |
| 388 |          | 388, 387, 385, 374 | 440 |          | 440, 439, 437, 436 | 492 |          | 492, 491, 485, 484 |
| 389 |          | 389, 384, 380, 379 | 441 | 441, 410 | 441, 440, 433, 430 | 493 |          | 493, 490, 488, 483 |
| 390 | 390, 301 | 390, 388, 380, 377 | 442 |          | 442, 440, 437, 435 | 494 | 494, 357 | 494, 493, 489, 481 |
| 391 | 391, 363 | 391, 390, 389, 385 | 443 |          | 443, 442, 437, 433 | 495 | 495, 419 | 495, 494, 486, 480 |
| 392 |          | 392, 386, 382, 379 | 444 |          | 444, 435, 432, 431 | 496 |          | 496, 494, 491, 480 |
| 393 | 393, 386 | 393, 392, 391, 386 | 445 |          | 445, 441, 439, 438 | 497 | 497, 419 | 497, 493, 488, 486 |
| 394 | 394, 259 | 394, 392, 387, 386 | 446 | 446, 341 | 446, 442, 439, 431 | 498 |          | 498, 495, 489, 487 |
| 395 |          | 395, 390, 389, 384 | 447 | 447, 374 | 447, 446, 441, 438 | 499 |          | 499, 494, 493, 488 |
| 396 | 396, 371 | 396, 392, 390, 389 | 448 |          | 448, 444, 442, 437 | 500 |          | 500, 499, 494, 490 |
| 397 |          | 397, 392, 387, 385 | 449 | 449, 315 | 449, 446, 440, 438 | 501 |          | 501, 499, 497, 496 |
| 398 |          | 398, 393, 392, 384 | 450 | 450, 371 | 450, 443, 438, 434 | 502 |          | 502, 498, 497, 494 |
| 399 | 399, 313 | 399, 397, 390, 388 | 451 |          | 451, 450, 441, 435 | 503 | 503, 500 | 503, 502, 501, 500 |
| 400 |          | 400, 398, 397, 395 | 452 |          | 452, 448, 447, 446 | 504 |          | 504, 502, 490, 483 |
| 401 | 401, 249 | 401, 399, 392, 389 | 453 |          | 453, 449, 447, 438 | 505 | 505, 349 | 505, 500, 497, 493 |
| 402 |          | 402, 399, 398, 393 | 454 |          | 454, 449, 445, 444 | 506 | 506, 411 | 506, 501, 494, 491 |
| 403 |          | 403, 398, 395, 394 | 455 | 455, 417 | 455, 453, 449, 444 | 507 |          | 507, 504, 501, 494 |
| 404 | 404, 215 | 404, 400, 398, 397 | 456 |          | 456, 454, 445, 433 | 508 | 508, 399 | 508, 505, 500, 495 |
| 405 |          | 405, 398, 397, 388 | 457 | 457, 441 | 457, 454, 449, 446 | 509 |          | 509, 506, 502, 501 |
| 406 | 406, 249 | 406, 402, 397, 393 | 458 | 458, 255 | 458, 453, 448, 445 | 510 |          | 510, 501, 500, 498 |
| 407 | 407, 336 | 407, 402, 400, 398 | 459 |          | 459, 457, 454, 447 | 511 | 511, 501 | 511, 509, 503, 501 |
| 408 |          | 408, 407, 403, 401 | 460 | 460, 399 | 460, 459, 455, 451 | 512 |          | 512, 510, 507, 504 |
| 409 | 409, 322 | 409, 406, 404, 402 | 461 |          | 461, 460, 455, 454 | 513 | 513, 428 | 513, 505, 503, 500 |
| 410 |          | 410, 407, 406, 400 | 462 | 462, 389 | 462, 457, 451, 450 | 514 |          | 514, 511, 509, 507 |
| 411 |          | 411, 408, 401, 399 | 463 | 463, 370 | 463, 456, 455, 452 | 515 |          | 515, 511, 508, 501 |
| 412 | 412, 265 | 412, 409, 404, 401 | 464 |          | 464, 460, 455, 441 | 516 |          | 516, 514, 511, 509 |
| 413 |          | 413, 407, 406, 403 | 465 | 465, 406 | 465, 463, 462, 457 | 517 |          | 517, 515, 507, 505 |
| 414 |          | 414, 405, 401, 398 | 466 |          | 466, 460, 455, 452 | 518 | 518, 485 | 518, 516, 515, 507 |
| 415 | 415, 313 | 415, 413, 411, 406 | 467 |          | 467, 466, 461, 456 | 519 | 519, 440 | 519, 517, 511, 507 |
| 416 |          | 416, 414, 411, 407 | 468 |          | 468, 464, 459, 453 | 520 |          | 520, 509, 507, 503 |
| 417 | 417, 310 | 417, 416, 414, 407 | 469 |          | 469, 467, 464, 460 | 521 | 521, 489 | 521, 519, 514, 512 |
| 418 |          | 418, 417, 415, 403 | 470 | 470, 321 | 470, 468, 462, 461 | 522 |          | 522, 518, 509, 507 |
| 419 |          | 419, 415, 414, 404 | 471 | 471, 470 | 471, 469, 468, 465 | 523 |          | 523, 521, 517, 510 |
| 420 |          | 420, 412, 410, 407 | 472 |          | 472, 470, 469, 461 | 524 | 524, 357 | 524, 523, 519, 515 |
| 421 |          | 421, 419, 417, 416 | 473 |          | 473, 470, 467, 465 | 525 |          | 525, 524, 521, 519 |
| 422 | 422, 273 | 422, 421, 416, 412 | 474 | 474, 283 | 474, 465, 463, 456 | 526 |          | 526, 525, 521, 517 |
| 423 | 423, 398 | 423, 420, 418, 414 | 475 |          | 475, 471, 467, 466 | 527 | 527, 480 | 527, 526, 520, 518 |
| 424 |          | 424, 422, 417, 415 | 476 | 476, 461 | 476, 475, 468, 466 | 528 |          | 528, 526, 522, 517 |
| 425 | 425, 413 | 425, 422, 421, 418 | 477 |          | 477, 470, 462, 461 | 529 | 529, 487 | 529, 528, 525, 522 |
| 426 |          | 426, 415, 414, 412 | 478 | 478, 357 | 478, 477, 474, 472 | 530 |          | 530, 527, 523, 520 |
| 427 |          | 427, 422, 421, 416 | 479 | 479, 375 | 479, 475, 472, 470 | 531 |          | 531, 529, 525, 519 |
| 428 | 428, 323 | 428, 426, 425, 417 | 480 |          | 480, 473, 467, 464 | 532 | 532, 531 | 532, 529, 528, 522 |
| 429 |          | 429, 422, 421, 419 | 481 | 481, 343 | 481, 480, 472, 471 | 533 |          | 533, 531, 530, 529 |
| 430 |          | 430, 419, 417, 415 | 482 |          | 482, 477, 476, 473 | 534 |          | 534, 533, 529, 527 |
| 431 | 431, 311 | 431, 430, 428, 426 | 483 |          | 483, 479, 477, 474 | 535 |          | 535, 533, 529, 527 |

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| $n$ | LFSR-2   | LFSR-4             | $n$ | LFSR-2   | LFSR-4             | $n$ | LFSR-2   | LFSR-4             |
|-----|----------|--------------------|-----|----------|--------------------|-----|----------|--------------------|
| 536 |          | 536, 533, 531, 529 | 588 | 588, 437 | 588, 577, 572, 571 | 640 |          | 640, 638, 637, 626 |
| 537 | 537, 443 | 537, 536, 535, 527 | 589 |          | 589, 586, 585, 579 | 641 | 641, 630 | 641, 640, 636, 622 |
| 538 |          | 538, 537, 536, 533 | 590 | 590, 497 | 590, 588, 587, 578 | 642 | 642, 523 | 642, 636, 633, 632 |
| 539 |          | 539, 535, 534, 529 | 591 |          | 591, 587, 585, 582 | 643 |          | 643, 641, 640, 632 |
| 540 | 540, 361 | 540, 537, 534, 529 | 592 |          | 592, 591, 573, 568 | 644 |          | 644, 634, 633, 632 |
| 541 |          | 541, 537, 531, 528 | 593 | 593, 507 | 593, 588, 585, 584 | 645 |          | 645, 641, 637, 634 |
| 542 |          | 542, 540, 539, 533 | 594 | 594, 575 | 594, 586, 584, 583 | 646 | 646, 397 | 646, 635, 634, 633 |
| 543 | 543, 527 | 543, 538, 536, 532 | 595 |          | 595, 594, 593, 586 | 647 | 647, 642 | 647, 646, 643, 642 |
| 544 |          | 544, 538, 535, 531 | 596 |          | 596, 592, 591, 590 | 648 |          | 648, 647, 626, 625 |
| 545 | 545, 423 | 545, 539, 537, 532 | 597 |          | 597, 588, 585, 583 | 649 | 649, 612 | 649, 648, 644, 638 |
| 546 |          | 546, 545, 544, 538 | 598 |          | 598, 597, 592, 591 | 650 | 650, 647 | 650, 644, 635, 632 |
| 547 |          | 547, 543, 540, 534 | 599 | 599, 569 | 599, 593, 591, 590 | 651 |          | 651, 646, 638, 637 |
| 548 |          | 548, 545, 543, 538 | 600 |          | 600, 599, 590, 589 | 652 | 652, 559 | 652, 647, 643, 641 |
| 549 |          | 549, 546, 545, 533 | 601 | 601, 400 | 601, 600, 597, 589 | 653 |          | 653, 646, 645, 643 |
| 550 | 550, 357 | 550, 546, 533, 529 | 602 |          | 602, 596, 594, 591 | 654 |          | 654, 649, 643, 640 |
| 551 | 551, 416 | 551, 550, 547, 542 | 603 |          | 603, 600, 599, 597 | 655 | 655, 567 | 655, 653, 639, 638 |
| 552 |          | 552, 550, 547, 532 | 604 |          | 604, 600, 598, 589 | 656 |          | 656, 646, 638, 637 |
| 553 | 553, 514 | 553, 550, 549, 542 | 605 |          | 605, 600, 598, 595 | 657 | 657, 619 | 657, 656, 650, 649 |
| 554 |          | 554, 551, 546, 543 | 606 |          | 606, 602, 599, 591 | 658 | 658, 603 | 658, 651, 648, 646 |
| 555 |          | 555, 551, 546, 545 | 607 | 607, 502 | 607, 600, 598, 595 | 659 |          | 659, 657, 655, 644 |
| 556 | 556, 403 | 556, 549, 546, 540 | 608 |          | 608, 606, 602, 585 | 660 |          | 660, 657, 656, 648 |
| 557 |          | 557, 552, 551, 550 | 609 | 609, 578 | 609, 601, 600, 597 | 661 |          | 661, 657, 650, 649 |
| 558 |          | 558, 553, 549, 544 | 610 | 610, 483 | 610, 602, 600, 599 | 662 | 662, 365 | 662, 659, 656, 650 |
| 559 | 559, 525 | 559, 557, 552, 550 | 611 |          | 611, 609, 607, 601 | 663 | 663, 406 | 663, 655, 652, 649 |
| 560 |          | 560, 554, 551, 549 | 612 |          | 612, 607, 602, 598 | 664 |          | 664, 662, 660, 649 |
| 561 | 561, 490 | 561, 558, 552, 550 | 613 |          | 613, 609, 603, 594 | 665 | 665, 632 | 665, 661, 659, 654 |
| 562 |          | 562, 560, 558, 551 | 614 |          | 614, 613, 612, 607 | 666 |          | 666, 664, 659, 656 |
| 563 |          | 563, 561, 554, 549 | 615 | 615, 404 | 615, 614, 609, 608 | 667 |          | 667, 664, 660, 649 |
| 564 | 564, 401 | 564, 563, 561, 558 | 616 |          | 616, 614, 602, 597 | 668 |          | 668, 658, 656, 651 |
| 565 |          | 565, 564, 559, 554 | 617 | 617, 417 | 617, 612, 608, 607 | 669 |          | 669, 667, 665, 664 |
| 566 | 566, 413 | 566, 564, 561, 560 | 618 |          | 618, 615, 604, 598 | 670 | 670, 517 | 670, 669, 665, 664 |
| 567 | 567, 424 | 567, 563, 557, 556 | 619 |          | 619, 614, 611, 610 | 671 | 671, 656 | 671, 669, 665, 662 |
| 568 |          | 568, 558, 557, 551 | 620 |          | 620, 619, 618, 611 | 672 |          | 672, 667, 666, 661 |
| 569 | 569, 492 | 569, 568, 559, 557 | 621 |          | 621, 616, 615, 609 | 673 | 673, 645 | 673, 666, 664, 663 |
| 570 | 570, 503 | 570, 563, 558, 552 | 622 | 622, 325 | 622, 612, 610, 605 | 674 |          | 674, 671, 665, 660 |
| 571 |          | 571, 569, 566, 561 | 623 | 623, 555 | 623, 614, 613, 612 | 675 |          | 675, 674, 672, 669 |
| 572 |          | 572, 571, 564, 560 | 624 |          | 624, 617, 615, 612 | 676 | 676, 435 | 676, 675, 671, 664 |
| 573 |          | 573, 569, 567, 563 | 625 | 625, 492 | 625, 620, 617, 613 | 677 |          | 677, 674, 673, 669 |
| 574 | 574, 561 | 574, 569, 565, 560 | 626 |          | 626, 623, 621, 613 | 678 |          | 678, 675, 673, 663 |
| 575 | 575, 429 | 575, 572, 570, 569 | 627 |          | 627, 622, 617, 613 | 679 | 679, 613 | 679, 676, 667, 661 |
| 576 |          | 576, 573, 572, 563 | 628 | 628, 405 | 628, 626, 617, 616 | 680 |          | 680, 679, 650, 645 |
| 577 | 577, 552 | 577, 575, 574, 569 | 629 |          | 629, 627, 624, 623 | 681 |          | 681, 678, 672, 670 |
| 578 |          | 578, 562, 556, 555 | 630 |          | 630, 628, 626, 623 | 682 |          | 682, 681, 679, 675 |
| 579 |          | 579, 572, 570, 567 | 631 | 631, 324 | 631, 625, 623, 617 | 683 |          | 683, 682, 677, 672 |
| 580 |          | 580, 579, 576, 574 | 632 |          | 632, 629, 619, 613 | 684 |          | 684, 681, 671, 666 |
| 581 |          | 581, 575, 574, 568 | 633 | 633, 532 | 633, 632, 631, 626 | 685 |          | 685, 684, 682, 681 |
| 582 | 582, 497 | 582, 579, 576, 571 | 634 | 634, 319 | 634, 631, 629, 627 | 686 | 686, 489 | 686, 684, 674, 673 |
| 583 | 583, 453 | 583, 581, 577, 575 | 635 |          | 635, 631, 625, 621 | 687 | 687, 674 | 687, 682, 675, 673 |
| 584 |          | 584, 581, 571, 570 | 636 |          | 636, 632, 628, 623 | 688 |          | 688, 682, 674, 669 |
| 585 | 585, 464 | 585, 583, 582, 577 | 637 |          | 637, 636, 628, 623 | 689 | 689, 675 | 689, 686, 683, 681 |
| 586 |          | 586, 584, 581, 579 | 638 |          | 638, 637, 633, 632 | 690 |          | 690, 687, 683, 680 |
| 587 |          | 587, 586, 581, 576 | 639 | 639, 623 | 639, 636, 635, 629 | 691 |          | 691, 689, 685, 678 |

Continued ...

| $n$ | LFSR-2   | LFSR-4             | $n$ | LFSR-2   | LFSR-4             | $n$  | LFSR-2   | LFSR-4                 |
|-----|----------|--------------------|-----|----------|--------------------|------|----------|------------------------|
| 692 | 692, 393 | 692, 687, 686, 678 | 725 |          | 725, 720, 719, 716 | 758  |          | 758, 757, 746, 741     |
| 693 |          | 693, 691, 685, 678 | 726 | 726, 721 | 726, 725, 722, 721 | 759  | 759, 661 | 759, 757, 756, 750     |
| 694 |          | 694, 691, 681, 677 | 727 | 727, 547 | 727, 721, 719, 716 | 760  |          | 760, 757, 747, 734     |
| 695 | 695, 483 | 695, 694, 691, 686 | 728 |          | 728, 726, 725, 724 | 761  | 761, 758 | 761, 760, 759, 758     |
| 696 |          | 696, 694, 686, 673 | 729 | 729, 671 | 729, 726, 724, 718 | 762  | 762, 679 | 762, 761, 755, 745     |
| 697 | 697, 430 | 697, 689, 685, 681 | 730 | 730, 583 | 730, 726, 715, 711 | 763  |          | 763, 754, 749, 747     |
| 698 | 698, 483 | 698, 690, 689, 688 | 731 |          | 731, 729, 725, 723 | 764  |          | 764, 761, 759, 758     |
| 699 |          | 699, 698, 689, 684 | 732 |          | 732, 729, 728, 725 | 765  |          | 765, 760, 755, 754     |
| 700 |          | 700, 698, 695, 694 | 733 |          | 733, 731, 726, 725 | 766  |          | 766, 757, 747, 744     |
| 701 |          | 701, 699, 697, 685 | 734 |          | 734, 724, 721, 720 | 767  | 767, 599 | 767, 763, 760, 759     |
| 702 | 702, 665 | 702, 701, 699, 695 | 735 | 735, 691 | 735, 733, 728, 727 | 768  |          | 768, 764, 751, 749     |
| 703 |          | 703, 702, 696, 691 | 736 |          | 736, 730, 728, 723 | 769  | 769, 649 | 769, 763, 762, 760     |
| 704 |          | 704, 701, 699, 692 | 737 | 737, 732 | 737, 736, 733, 732 | 770  |          | 770, 768, 765, 756     |
| 705 | 705, 686 | 705, 704, 698, 697 | 738 | 738, 391 | 738, 730, 729, 727 | 771  |          | 771, 765, 756, 754     |
| 706 |          | 706, 697, 695, 692 | 739 |          | 739, 731, 723, 721 | 772  | 772, 765 | 772, 767, 766, 764     |
| 707 |          | 707, 702, 699, 692 | 740 | 740, 587 | 740, 737, 728, 716 | 773  |          | 773, 767, 765, 763     |
| 708 | 708, 421 | 708, 706, 704, 703 | 741 |          | 741, 738, 733, 732 | 774  | 774, 589 | 774, 767, 760, 758     |
| 709 |          | 709, 708, 706, 705 | 742 |          | 742, 741, 738, 730 | 775  | 775, 408 | 775, 771, 769, 768     |
| 710 |          | 710, 709, 696, 695 | 743 | 743, 653 | 743, 742, 731, 730 | 776  |          | 776, 773, 764, 759     |
| 711 | 711, 619 | 711, 704, 703, 700 | 744 |          | 744, 743, 733, 731 | 777  | 777, 748 | 777, 776, 767, 761     |
| 712 |          | 712, 709, 708, 707 | 745 | 745, 487 | 745, 740, 738, 737 | 778  | 778, 403 | 778, 775, 762, 759     |
| 713 | 713, 672 | 713, 706, 703, 696 | 746 | 746, 395 | 746, 738, 733, 728 | 779  |          | 779, 776, 771, 769     |
| 714 | 714, 691 | 714, 709, 707, 701 | 747 |          | 747, 743, 741, 737 | 780  |          | 780, 775, 772, 764     |
| 715 |          | 715, 714, 711, 708 | 748 |          | 748, 744, 743, 733 | 781  |          | 781, 779, 765, 764     |
| 716 | 716, 533 | 716, 706, 705, 704 | 749 |          | 749, 748, 743, 742 | 782  | 782, 453 | 782, 780, 779, 773     |
| 717 |          | 717, 716, 710, 701 | 750 |          | 750, 746, 741, 734 | 783  | 783, 715 | 783, 782, 776, 773     |
| 718 |          | 718, 717, 716, 713 | 751 | 751, 733 | 751, 750, 748, 740 | 784  |          | 784, 778, 775, 771     |
| 719 | 719, 569 | 719, 711, 710, 707 | 752 |          | 752, 749, 732, 731 | 785  | 785, 693 | 785, 780, 776, 775     |
| 720 |          | 720, 718, 712, 709 | 753 | 753, 595 | 753, 748, 745, 740 | 786  |          | 786, 782, 780, 771     |
| 721 | 721, 712 | 721, 720, 713, 712 | 754 | 754, 735 | 754, 742, 740, 735 | 1024 |          | 1024, 1015, 1002, 1001 |
| 722 | 722, 491 | 722, 721, 718, 707 | 755 |          | 755, 754, 745, 743 | 2048 |          | 2048, 2035, 2034, 2029 |
| 723 |          | 723, 717, 710, 707 | 756 | 756, 407 | 756, 755, 747, 740 | 4096 |          | 4096, 4095, 4081, 4069 |
| 724 |          | 724, 719, 716, 711 | 757 |          | 757, 756, 751, 750 |      |          |                        |