1.A good hash function should have a good distribution of outputs. This means that the hash function should produce a uniform distribution of hash values, regardless of the input data.

2. A good hash function should also have a low collision rate. This means that the hash function should produce distinct hash values for distinct input data as much as possible. If two different input data produce the same hash value, it is called a collision.

Task 2:

a, [0] -> 12 -> 44 -> 13 -> 88 -> 23 -> 94 -> 11 -> 39 -> 20 -> 16 -> 5

[1] -> 22 -> 55 -> 24 -> 99 -> 34 -> 109 -> 41 -> 61 -> 71 -> 81 -> 91 -> 101 -> 111 -> 121 -> 131 -> 141 -> 151 -> 161 -> 171 -> 181 -> 191 -> 201 -> 211 -> 221 -> 231 -> 241 -> 251 -> 261 -> 271 -> 281 -> 291 -> 301 -> 311 -> 321 -> 331 -> 341 -> 351 -> 361 -> 371 -> 381 -> 391 -> 401 -> 411 -> 421 -> 431 -> 441 -> 451 -> 461 -> 471 -> 481 -> 491 -> 501 -> 511 -> 521 -> 531 -> 541 -> 551 -> 561

b, [0] -> 12 -> 44 -> 13 -> 88 -> 23 -> 94 -> 11 -> 39 -> 20 -> 16 -> 5

[1] -> 22 -> 55 -> 24 -> 99 -> 34 -> 109 -> 41 -> 61 -> 71 -> 81 -> 91 -> 101 -> 111 -> 121 -> 131 -> 141 -> 151 -> 161 -> 171 -> 181 -> 191 -> 201 -> 211 -> 221 -> 231 -> 241 -> 251 -> 261 -> 271 -> 281 -> 291 -> 301 -> 311 -> 321 -> 331 -> 341 -> 351 -> 361 -> 371 -> 381 -> 391 -> 401 -> 411 -> 421 -> 431 -> 441 -> 451 -> 461 -> 471 -> 481 -> 491 -> 501 -> 511 -> 521 -> 531 -> 541 -> 551 -> 561 -> 571 -> 581 -> 591 -> 601 -> 611 -> 621 -> 631 -> 641 -> 651 -> 661 -> 671 -> 681 -> 691

Task 3

c, [0] -> 4 -> 17 -> 22 -> 26 -> 29 -> 32 -> 35 -> 38 -> 41 -> 44 -> 47 -> 50 -> 53 -> 56 -> 59 -> 62 -> 65 -> 68 -> 71 -> 74 -> 77 -> 80 -> 83 -> 86 -> 89 -> 92 -> 95 -> 98 -> 101 -> 104 -> 107 -> 110 -> 113 -> 116 -> 119 -> 122 -> 125 -> 128 -> 131 -> 134 -> 137 -> 140 -> 143 -> 146 -> 149 -> 152 -> 155 -> 158 -> 161 -> 164 -> 167 -> 170 -> 173 -> 176 -> 179 -> 182 -> 185 -> 188 -> 191 -> 194 -> 197 -> 200 -> 203 -> 206 -> 209 -> 212 -> 215 -> 218 -> 221 -> 224 -> 227 -> 230 -> 233 -> 236 -> 239 -> 242 -> 245 -> 248 -> 251 -> 254 -> 257 -> 260 -> 263 -> 266 -> 2

d, [0] -> 4 -> 17 -> 22 -> 26 -> 29 -> 32 -> 35 -> 38 -> 41 -> 44 -> 47 -> 50 -> 53 -> 56 -> 59 -> 62 -> 65 -> 68 -> 71 -> 74 -> 77 -> 80 -> 83 -> 86 -> 89 -> 92 -> 95 -> 98 -> 101 -> 104 -> 107 -> 110 -> 113 -> 116 -> 119 -> 122 -> 125 -> 128 -> 131 -> 134 -> 137 -> 140 -> 143 -> 146 -> 149 -> 152 -> 155 -> 158 -> 161 -> 164 -> 167 -> 170 -> 173 -> 176 -> 179 -> 182 -> 185 -> 188 -> 191 -> 194 -> 197 -> 200 -> 203 -> 206 -> 209 -> 212 -> 215 -> 218 -> 221 -> 224 -> 227 -> 230 -> 233 -> 236 -> 239 -> 242 -> 245 -> 248 -> 251 -> 254 -> 257 -> 260 -> 263 -> 266 -> 269