EG

January 1996

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Thanks once more to Lars Rasmussen **EG** is able to give its readers the world's first sight of the complete list of reciprocal zugzwangs in the 5-man endgame queen and pawn against queen (where White wins with Black to move).

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  1: (wKa8. Qb7. Pa7: bKh8. Qc3) Btm ( 39)
  2: (wKb8. Qa8. Pa7: bKb6. Qa6) Btm (  3)
  3: (wKh8. Qh7. Pa7: bKg5. Qc6) Btm ( 31)
  4: (wKh6. Qh7. Pa7: bKe6. Qa8) Btm ( 24)
  5: (wKa3. Qf7. Pa7: bKc8. Qa8) Btm (  2)
  6: (wKa2. Qb2. Pa7: bKc4. Qf3) Btm (  8)
  7: (wKa1. Qh7. Pa7: bKc8. Qa8) Btm (  2)
  8: (wKf1. Qc5. Pa7: bKh4. Qe4) Btm ( 19)
  9: (wKg1. Qf2. Pa7: bKb5. Qa3) Btm (  5)
 10: (wKg1. Qd7. Pa7: bKe1. Qe4) Btm ( 31)
 11: (wKd8. Qd6. Pa6: bKh5. Qe3) Btm ( 59)
 12: (wKe8. Qb5. Pa6: bKc3. Qc7) Btm ( 58)
 13: (wKf8. Qd6. Pa6: bKh5. Qe3) Btm ( 62)
 14: (wKf8. Qb5. Pa6: bKd4. Qc7) Btm ( 59)
 15: (wKf8. Qb5. Pa6: bKd4. Qe6) Btm ( 33)
 16: (wKg8. Qb5. Pa6: bKc3. Qc7) Btm ( 60)
 17: (wKh8. Qd6. Pa6: bKe4. Qf7) Btm ( 46)
 18: (wKa7. Qd5. Pa6: bKf6. Qb4) Btm ( 51)
 19: (wKa7. Qe5. Pa6: bKg6. Qb4) Btm ( 50)
 20: (wKa7. Qb4. Pa6: bKd5. Qe8) Btm ( 21)
 21: (wKa7. Qb6. Pa6: bKc4. Qc8) Btm ( 17)
 22: (wKe7. Qd3. Pa6: bKf4. Qa4) Btm ( 40)
 23: (wKe7. Qh6. Pa6: bKg4. Qd3) Btm ( 45)
 24: (wKe7. Qf4. Pa6: bKd3. Qa5) Btm ( 42)
 25: (wKe6. Qc4. Pa6: bKe3. Qa3) Btm ( 67)
 26: (wKe6. Qb5. Pa6: bKa1. Qa7) Btm ( 36)
 27: (wKb5. Qc6. Pa6: bKd1. Qd4) Btm ( 56)
 28: (wKd5. Qe6. Pa6: bKb3. Qc7) Btm ( 53)
 29: (wKg5. Qg4. Pa6: bKg8. Qc7) Btm ( 22)
 30: (wKa4. Qd3. Pa6: bKe6. Qh8) Btm ( 28)
 31: (wKa4. Qb4. Pa6: bKc2. Qe3) Btm ( 29)
 32: (wKe4. Qc4. Pa6: bKh4. Qa3) Btm ( 29)
 33: (wKf4. Qc8. Pa6: bKd4. Qa4) Btm ( 45)
 34: (wKh4. Qd3. Pa6: bKe6. Qc6) Btm ( 33)
 35: (wKa3. Qd6. Pa6: bKf5. Qb5) Btm ( 67)
 36: (wKb3. Qd6. Pa6: bKe8. Qe4) Btm ( 33)
 37: (wKb3. Qd3. Pa6: bKe8. Qa5) Btm ( 47)
 38: (wKf3. Qc4. Pa6: bKa3. Qa7) Btm ( 33)
 39: (wKh3. Qg3. Pa6: bKf6. Qd2) Btm ( 49)
 40: (wKa2. Qd6. Pa6: bKe4. Qb5) Btm ( 68)
 41: (wKg2. Qc4. Pa6: bKh5. Qe3) Btm ( 71)
 42: (wKb1. Qb7. Pa6: bKg8. Qc5) Btm ( 66)
 43: (wKc1. Qc3. Pa6: bKh6. Qe4) Btm ( 66)
 44: (wKc1. Qd3. Pa6: bKa2. Qa7) Btm (  6)
 45: (wKe1. Qf1. Pa6: bKa1. Qa4) Btm ( 24)
 46: (wKf1. Qc4. Pa6: bKg5. Qe3) Btm ( 70)
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 47: (wKa8. Qf5. Pa5: bKh6. Qc7) Btm ( 68)
 48: (wKb8. Qe5. Pa5: bKg6. Qc6) Btm ( 68)
 49: (wKa7. Qe5. Pa5: bKf7. Qc6) Btm ( 69)
 50: (wKc6. Qc5. Pa5: bKe4. Qd3) Btm ( 38)
 51: (wKb4. Qe5. Pa5: bKf7. Qa6) Btm ( 62)
 52: (wKb3. Qd2. Pa5: bKg8. Qa8) Btm ( 68)
 53: (wKe7. Qe3. Pa4: bKh7. Qf5) Btm ( 69)
 54: (wKa6. Qe8. Pa4: bKg7. Qa1) Btm ( 71)
 55: (wKe6. Qc4. Pa4: bKg7. Qd1) Btm ( 73)
 56: (wKa8. Qa7. Pb7: bKc7. Qd5) Btm ( 30)
 57: (wKa8. Qd7. Pb7: bKa6. Qe4) Btm ( 12)
 58: (wKa8. Qb4. Pb7: bKa6. Qc6) Btm (  6)
 59: (wKa8. Qg1. Pb7: bKf4. Qd5) Btm ( 19)
 60: (wKb8. Qg5. Pb7: bKb4. Qe6) Btm ( 17)
 61: (wKc8. Qb8. Pb7: bKc6. Qb6) Btm (  8)
 62: (wKe8. Qa6. Pb7: bKb4. Qc7) Btm ( 13)
 63: (wKh7. Qg6. Pb7: bKa1. Qc2) Btm ( 17)
 64: (wKg6. Qa6. Pb7: bKb4. Qc7) Btm ( 15)
 65: (wKh4. Qe7. Pb7: bKh1. Qb1) Btm (  7)
 66: (wKb3. Qg7. Pb7: bKd8. Qb8) Btm (  3)
 67: (wKb3. Qc3. Pb7: bKh1. Qg3) Btm ( 11)
 68: (wKf3. Qb6. Pb7: bKd7. Qd8) Btm ( 17)
 69: (wKg3. Qf3. Pb7: bKa1. Qb3) Btm ( 12)
 70: (wKa1. Qe3. Pb7: bKa4. Qa5) Btm (  3)
 71: (wKb1. Qc6. Pb7: bKd8. Qb8) Btm (  5)
 72: (wKb1. Qb6. Pb7: bKd7. Qb8) Btm ( 16)
 73: (wKd1. Qc6. Pb7: bKd8. Qb8) Btm ( 12)
 74: (wKd1. Qb6. Pb7: bKd7. Qb8) Btm ( 14)
 75: (wKe1. Qg7. Pb7: bKd8. Qb8) Btm (  3)
 76: (wKf1. Qf7. Pb7: bKd8. Qb8) Btm (  3)
 77: (wKh1. Qg2. Pb7: bKc5. Qb3) Btm (  5)
 78: (wKd8. Qe3. Pb6: bKg4. Qb7) Btm ( 40)
 79: (wKd8. Qa6. Pb6: bKb2. Qc6) Btm ( 41)
 80: (wKe8. Qe3. Pb6: bKf5. Qb7) Btm ( 41)
 81: (wKf8. Qa6. Pb6: bKh6. Qe6) Btm ( 48)
 82: (wKa7. Qa6. Pb6: bKc6. Qd4) Btm ( 41)
 83: (wKf7. Qg4. Pb6: bKe3. Qb5) Btm ( 29)
 84: (wKg7. Qa7. Pb6: bKg5. Qg2) Btm ( 43)
 85: (wKa6. Qh1. Pb6: bKb8. Qg7) Btm (  3)
 86: (wKa6. Qg1. Pb6: bKe2. Qf6) Btm ( 39)
 87: (wKa6. Qg2. Pb6: bKe1. Qf6) Btm ( 73)
 88: (wKd6. Qd8. Pb6: bKd4. Qb7) Btm ( 18)
 89: (wKf6. Qa6. Pb6: bKh6. Qe8) Btm ( 40)
 90: (wKg6. Qf6. Pb6: bKe4. Qd7) Btm ( 35)
 91: (wKh6. Qg6. Pb6: bKf4. Qe7) Btm ( 37)
 92: (wKa5. Qe5. Pb6: bKf3. Qb3) Btm ( 67)
 93: (wKa5. Qg6. Pb6: bKf1. Qb3) Btm ( 67)
 94: (wKc5. Qc6. Pb6: bKa5. Qa6) Btm (  2)
 95: (wKe5. Qd4. Pb6: bKf1. Qb3) Btm ( 63)
 96: (wKa4. Qc2. Pb6: bKg3. Qe1) Btm ( 38)
 97: (wKh4. Qf6. Pb6: bKe4. Qd7) Btm ( 37)
 98: (wKh4. Qc6. Pb6: bKf2. Qf5) Btm ( 41)
 99: (wKa3. Qe3. Pb6: bKf8. Qc4) Btm ( 36)
100: (wKa3. Qe3. Pb6: bKf5. Qb5) Btm ( 45)
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101: (wKa3. Qc7. Pb6: bKb1. Qb5) Btm ( 39)        175: (wKb7. Qg4. Pb4: bKh6. Qb2) Btm ( 57)
102: (wKa3. Qc7. Pb6: bKd1. Qb5) Btm ( 42)        176: (wKc7. Qg4. Pb4: bKf6. Qf1) Btm ( 80)
103: (wKe3. Qb1. Pb6: bKc3. Qa6) Btm ( 29)        177: (wKd7. Qg4. Pb4: bKh6. Qb2) Btm ( 62)
104: (wKh3. Qb3. Pb6: bKf6. Qe5) Btm ( 57)        178: (wKa6. Qb5. Pb4: bKd6. Qc3) Btm ( 62)
105: (wKh3. Qg4. Pb6: bKe3. Qb1) Btm ( 45)        179: (wKa5. Qc4. Pb4: bKd8. Qd6) Btm ( 65)
106: (wKa2. Qe3. Pb6: bKf8. Qb5) Btm ( 43)        180: (wKa5. Qb5. Pb4: bKe6. Qh8) Btm ( 62)
107: (wKa2. Qe3. Pb6: bKf6. Qb5) Btm ( 44)        181: (wKb5. Qc5. Pb4: bKe6. Qh8) Btm ( 59)
108: (wKb2. Qc2. Pb6: bKd4. Qf3) Btm ( 40)        182: (wKa4. Qc5. Pb4: bKd8. Qb8) Btm ( 59)
109: (wKb2. Qc5. Pb6: bKh2. Qa6) Btm ( 32)        183: (wKd4. Qc3. Pb4: bKf6. Qe2) Btm ( 68)
110: (wKc2. Qd4. Pb6: bKa3. Qb7) Btm ( 16)        184: (wKa3. Qc7. Pb4: bKe8. Qb5) Btm ( 62)
111: (wKe2. Qe3. Pb6: bKf8. Qd6) Btm ( 47)        185: (wKa3. Qd6. Pb4: bKf7. Qb5) Btm ( 49)
112: (wKf2. Qe3. Pb6: bKf7. Qd6) Btm ( 48)        186: (wKb3. Qc7. Pb4: bKe8. Qa6) Btm ( 54)
113: (wKg2. Qd4. Pb6: bKf5. Qb3) Btm ( 46)        187: (wKb3. Qd6. Pb4: bKe8. Qb5) Btm ( 48)
114: (wKh2. Qg3. Pb6: bKf8. Qd7) Btm ( 47)        188: (wKb3. Qd5. Pb4: bKe8. Qa6) Btm ( 54)
115: (wKh2. Qf6. Pb6: bKe3. Qb5) Btm ( 39)        189: (wKc3. Qc4. Pb4: bKa3. Qa4) Btm (  2)
116: (wKh2. Qf6. Pb6: bKe1. Qg4) Btm ( 33)        190: (wKf3. Qe7. Pb4: bKg8. Qd4) Btm ( 58)
117: (wKa1. Qd6. Pb6: bKe8. Qc2) Btm ( 45)        191: (wKb2. Qd7. Pb4: bKf8. Qe3) Btm ( 48)
118: (wKa1. Qe3. Pb6: bKf7. Qb5) Btm ( 49)        192: (wKb2. Qd6. Pb4: bKf7. Qc4) Btm ( 50)
119: (wKa1. Qe3. Pb6: bKf6. Qb4) Btm ( 45)        193: (wKb2. Qc5. Pb4: bKd3. Qc4) Btm ( 61)
120: (wKa1. Qe3. Pb6: bKf5. Qb5) Btm ( 51)        194: (wKa7. Qb6. Pb3: bKd7. Qg8) Btm ( 64)
121: (wKa1. Qc2. Pb6: bKd4. Qd6) Btm ( 58)        195: (wKc5. Qb4. Pb3: bKe7. Qa6) Btm ( 65)
122: (wKe1. Qd6. Pb6: bKe8. Qb5) Btm ( 43)        196: (wKa4. Qe5. Pb3: bKf7. Qd1) Btm ( 74)
123: (wKe1. Qc5. Pb6: bKf4. Qd3) Btm ( 47)        197: (wKf4. Qb6. Pb3: bKf8. Qe8) Btm ( 71)
124: (wKe1. Qe3. Pb6: bKg4. Qd5) Btm ( 54)        198: (wKa3. Qd6. Pb3: bKg7. Qb5) Btm ( 70)
125: (wKf1. Qe6. Pb6: bKd3. Qb2) Btm ( 46)        199: (wKd3. Qd5. Pb3: bKh6. Qb4) Btm ( 68)
126: (wKg1. Qg6. Pb6: bKf8. Qb7) Btm ( 52)        200: (wKb2. Qf6. Pb3: bKh7. Qc5) Btm ( 68)
127: (wKg1. Qe3. Pb6: bKf7. Qd5) Btm ( 49)        201: (wKc2. Qc3. Pb3: bKa2. Qa3) Btm (  1)
128: (wKg1. Qe2. Pb6: bKf4. Qd7) Btm ( 44)        202: (wKa6. Qb6. Pb2: bKd7. Qh8) Btm ( 67)
129: (wKh1. Qg4. Pb6: bKe3. Qa6) Btm ( 41)        203: (wKd6. Qe5. Pb2: bKb8. Qc4) Btm (  9)
130: (wKh1. Qg1. Pb6: bKa2. Qb5) Btm ( 46)        204: (wKe4. Qb5. Pb2: bKf7. Qc7) Btm ( 79)
131: (wKh1. Qf6. Pb6: bKe1. Qg8) Btm ( 44)        205: (wKe4. Qd3. Pb2: bKg6. Qc5) Btm ( 60)
132: (wKd8. Qd7. Pb5: bKe5. Qc5) Btm ( 41)        206: (wKa3. Qe5. Pb2: bKf8. Qd2) Btm ( 75)
133: (wKe8. Qf7. Pb5: bKh8. Qg6) Btm ( 32)        207: (wKd3. Qe5. Pb2: bKf7. Qc1) Btm ( 84)
134: (wKb7. Qg5. Pb5: bKd6. Qa1) Btm ( 52)        208: (wKc8. Qg6. Pc7: bKa5. Qd5) Btm ( 10)
135: (wKe7. Qd7. Pb5: bKe5. Qd5) Btm ( 42)        209: (wKd8. Qc8. Pc7: bKd6. Qc6) Btm (  6)
136: (wKe7. Qe2. Pb5: bKb1. Qd5) Btm ( 53)        210: (wKf8. Qf7. Pc7: bKh8. Qf5) Btm ( 23)
137: (wKg7. Qd7. Pb5: bKa1. Qa4) Btm ( 47)        211: (wKf8. Qa7. Pc7: bKh6. Qe6) Btm ( 24)
138: (wKa6. Qa2. Pb5: bKd6. Qd3) Btm ( 48)        212: (wKd7. Qd3. Pc7: bKa7. Qc5) Btm (  2)
139: (wKa6. Qa5. Pb5: bKc5. Qd3) Btm ( 41)        213: (wKh7. Qg7. Pc7: bKf5. Qe8) Btm ( 10)
140: (wKa6. Qa5. Pb5: bKc5. Qb2) Btm ( 71)        214: (wKd6. Qd8. Pc7: bKb7. Qc8) Btm (  2)
141: (wKb6. Qa4. Pb5: bKd5. Qb1) Btm ( 77)        215: (wKa5. Qc8. Pc7: bKc1. Qc6) Btm ( 19)
142: (wKb6. Qc3. Pb5: bKa2. Qe4) Btm ( 37)        216: (wKb5. Qc8. Pc7: bKc1. Qd6) Btm ( 18)
143: (wKb6. Qe3. Pb5: bKa2. Qd5) Btm ( 41)        217: (wKa4. Qc8. Pc7: bKf4. Qc5) Btm ( 21)
144: (wKb6. Qc5. Pb5: bKb2. Qc4) Btm ( 44)        218: (wKa4. Qf4. Pc7: bKc2. Qc5) Btm ( 22)
145: (wKf6. Qf5. Pb5: bKa1. Qc2) Btm ( 47)        219: (wKa4. Qc8. Pc7: bKf2. Qc5) Btm ( 23)
146: (wKh6. Qg6. Pb5: bKf3. Qe7) Btm ( 43)        220: (wKa4. Qc8. Pc7: bKa1. Qc6) Btm ( 12)
147: (wKa5. Qf3. Pb5: bKd6. Qc4) Btm ( 45)        221: (wKd4. Qc8. Pc7: bKe1. Qc6) Btm ( 23)
148: (wKa5. Qd4. Pb5: bKh5. Qf5) Btm ( 60)        222: (wKc3. Qc8. Pc7: bKg7. Qa4) Btm ( 24)
149: (wKa5. Qc6. Pb5: bKb3. Qf5) Btm ( 43)        223: (wKa2. Qc8. Pc7: bKe1. Qe3) Btm ( 23)
150: (wKa5. Qc3. Pb5: bKa2. Qd5) Btm ( 37)        224: (wKh2. Qd6. Pc7: bKb5. Qg4) Btm ( 24)
151: (wKa5. Qe3. Pb5: bKb2. Qd5) Btm ( 38)        225: (wKf1. Qf2. Pc7: bKd3. Qg4) Btm ( 16)
152: (wKc5. Qg3. Pb5: bKh5. Qa5) Btm ( 54)        226: (wKg1. Qg7. Pc7: bKe8. Qc8) Btm (  3)
153: (wKd5. Qc3. Pb5: bKa2. Qh6) Btm ( 40)        227: (wKg1. Qd6. Pc7: bKb5. Qf5) Btm ( 23)
154: (wKa4. Qd4. Pb5: bKh5. Qe8) Btm ( 57)        228: (wKg1. Qg2. Pc7: bKf4. Qc3) Btm (  2)
155: (wKc4. Qd5. Pb5: bKe7. Qd6) Btm ( 43)        229: (wKh1. Qh2. Pc7: bKg5. Qc3) Btm ( 24)
156: (wKc4. Qc5. Pb5: bKa4. Qa5) Btm (  2)        230: (wKh1. Qh2. Pc7: bKg4. Qc4) Btm ( 26)
157: (wKe4. Qc4. Pb5: bKh4. Qb6) Btm ( 60)        231: (wKh1. Qd6. Pc7: bKf1. Qc1) Btm ( 16)
158: (wKg4. Qf5. Pb5: bKg8. Qb7) Btm ( 50)        232: (wKa8. Qe8. Pc6: bKf6. Qc7) Btm ( 31)
159: (wKa3. Qe5. Pb5: bKf7. Qc4) Btm ( 48)        233: (wKa8. Qe4. Pc6: bKf6. Qb6) Btm ( 32)
160: (wKb3. Qc6. Pb5: bKd4. Qc5) Btm ( 33)        234: (wKa8. Qh6. Pc6: bKf5. Qc7) Btm ( 35)
161: (wKc3. Qe2. Pb5: bKf8. Qa4) Btm ( 49)        235: (wKa8. Qd5. Pc6: bKb4. Qb6) Btm ( 14)
162: (wKc3. Qe8. Pb5: bKf6. Qa4) Btm ( 48)        236: (wKc8. Qd8. Pc6: bKa3. Qb4) Btm ( 15)
163: (wKd3. Qe5. Pb5: bKf7. Qc1) Btm ( 41)        237: (wKc8. Qe8. Pc6: bKa8. Qf4) Btm ( 33)
164: (wKd3. Qe3. Pb5: bKf7. Qc7) Btm ( 42)        238: (wKf8. Qf3. Pc6: bKg5. Qe6) Btm ( 33)
165: (wKg3. Qc5. Pb5: bKe2. Qa5) Btm ( 52)        239: (wKf8. Qb6. Pc6: bKa4. Qe6) Btm ( 16)
166: (wKb2. Qe2. Pb5: bKf8. Qg3) Btm ( 47)        240: (wKh8. Qe4. Pc6: bKb3. Qg3) Btm ( 37)
167: (wKc2. Qd7. Pb5: bKf8. Qa3) Btm ( 44)        241: (wKb7. Qc8. Pc6: bKb5. Qe4) Btm ( 27)
168: (wKc2. Qd4. Pb5: bKa3. Qh1) Btm ( 17)        242: (wKd7. Qc7. Pc6: bKd5. Qc5) Btm ( 15)
169: (wKe2. Qb3. Pb5: bKh4. Qb6) Btm ( 57)        243: (wKd7. Qc3. Pc6: bKd5. Qa4) Btm ( 24)
170: (wKh2. Qd5. Pb5: bKg7. Qa4) Btm ( 47)        244: (wKh7. Qe4. Pc6: bKb3. Qg1) Btm ( 36)
171: (wKh1. Qc6. Pb5: bKh8. Qf2) Btm ( 44)        245: (wKh7. Qe4. Pc6: bKc3. Qg3) Btm ( 36)
172: (wKh1. Qc6. Pb5: bKa1. Qg3) Btm ( 51)        246: (wKa6. Qa3. Pc6: bKa8. Qd8) Btm ( 29)
173: (wKc8. Qc5. Pb4: bKa1. Qc2) Btm ( 45)        247: (wKa6. Qf3. Pc6: bKa8. Qd6) Btm ( 28)
174: (wKa7. Qb7. Pb4: bKd6. Qb2) Btm ( 51)        248: (wKa6. Qh1. Pc6: bKa8. Qf6) Btm (  4)
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249: (wKa6, Qa8, Pc6; bKe7, Qc7) Btm ( 33)      323: (wKg5, Qb6, Pc5; bKa4, Qf7) Btm ( 46)
250: (wKg6, Qg5, Pc6; bKh1, Qg3) Btm ( 35)      324: (wKg5, Qb5, Pc5; bKa3, Qf7) Btm ( 50)
251: (wKh6, Qg6, Pc6; bKf4, Qe7) Btm ( 29)      325: (wKg5, Qe3, Pc5; bKb2, Qf1) Btm ( 47)
252: (wKh6, Qe4, Pc6; bKb3, Qg3) Btm ( 35)      326: (wKb4, Qd5, Pc5; bKe7, Qa6) Btm ( 32)
253: (wKb5, Qa5, Pc6; bKe7, Qd6) Btm ( 30)      327: (wKb4, Qh7, Pc5; bKe6, Qc6) Btm ( 40)
254: (wKb5, Qb4, Pc6; bKd5, Qe3) Btm ( 30)      328: (wKb4, Qh7, Pc5; bKe6, Qg3) Btm ( 36)
255: (wKh5, Qe6, Pc6; bKf8, Qg3) Btm ( 39)      329: (wKb4, Qh7, Pc5; bKe6, Qf1) Btm ( 35)
256: (wKh5, Qg6, Pc6; bKf4, Qd8) Btm ( 26)      330: (wKb4, Qb5, Pc5; bKd5, Qc8) Btm ( 39)
257: (wKh5, Qe4, Pc6; bKc3, Qg3) Btm ( 34)      331: (wKd4, Qf1, Pc5; bKg6, Qc6) Btm ( 42)
258: (wKa4, Qe8, Pc6; bKf6, Qb6) Btm ( 35)      332: (wKh4, Qd6, Pc5; bKh8, Qg6) Btm ( 32)
259: (wKa4, Qe4, Pc6; bKf6, Qc5) Btm ( 33)      333: (wKa3, Qf8, Pc5; bKg6, Qe4) Btm ( 40)
260: (wKb4, Qc5, Pc6; bKe6, Qa6) Btm ( 29)      334: (wKb3, Qf5, Pc5; bKg7, Qd4) Btm ( 35)
261: (wKc4, Qe4, Pc6; bKa4, Qd6) Btm ( 21)      335: (wKb3, Qc4, Pc5; bKe5, Qa5) Btm ( 41)
262: (wKe4, Qd1, Pc6; bKe7, Qa7) Btm ( 33)      336: (wKc3, Qe7, Pc5; bKf5, Qa4) Btm ( 35)
263: (wKg4, Qe4, Pc6; bKf8, Qd6) Btm ( 40)      337: (wKc3, Qb6, Pc5; bKf5, Qa4) Btm ( 39)
264: (wKg4, Qe4, Pc6; bKb3, Qc5) Btm ( 31)      338: (wKc3, Qe3, Pc5; bKa3, Qd5) Btm ( 40)
265: (wKh4, Qd4, Pc6; bKf3, Qg8) Btm ( 27)      339: (wKd3, Qf2, Pc5; bKg8, Qb4) Btm ( 45)
266: (wKa3, Qb3, Pc6; bKa1, Qd3) Btm ( 25)      340: (wKd3, Qe7, Pc5; bKf5, Qb4) Btm ( 36)
267: (wKa3, Qc7, Pc6; bKc1, Qc4) Btm ( 34)      341: (wKd3, Qc6, Pc5; bKf5, Qb4) Btm ( 38)
268: (wKb3, Qa6, Pc6; bKg7, Qc5) Btm ( 33)      342: (wKe3, Qe7, Pc5; bKg8, Qc4) Btm ( 38)
269: (wKb3, Qc5, Pc6; bKe6, Qa8) Btm ( 31)      343: (wKe3, Qf5, Pc5; bKg7, Qd1) Btm ( 40)
270: (wKb3, Qh7, Pc6; bKf6, Qg4) Btm ( 33)      344: (wKf3, Qf2, Pc5; bKd1, Qc4) Btm ( 49)
271: (wKb3, Qd2, Pc6; bKe4, Qc7) Btm ( 29)      345: (wKg3, Qd6, Pc5; bKh8, Qf5) Btm ( 45)
272: (wKe3, Qe4, Pc6; bKf8, Qd6) Btm ( 42)      346: (wKh3, Qd6, Pc5; bKh8, Qe4) Btm ( 46)
273: (wKe3, Qf3, Pc6; bKg8, Qd6) Btm ( 48)      347: (wKh3, Qc2, Pc5; bKe1, Qd4) Btm ( 50)
274: (wKe3, Qf3, Pc6; bKg6, Qd6) Btm ( 48)      348: (wKh3, Qf8, Pc5; bKg1, Qg5) Btm ( 53)
275: (wKa2, Qc5, Pc6; bKe6, Qh8) Btm ( 35)      349: (wKa2, Qf5, Pc5; bKg8, Qe3) Btm ( 41)
276: (wKa2, Qb5, Pc6; bKd4, Qh7) Btm ( 24)      350: (wKb2, Qd1, Pc5; bKe3, Qc6) Btm ( 43)
277: (wKa2, Qb5, Pc6; bKd4, Qf3) Btm ( 23)      351: (wKc2, Qd4, Pc5; bKa3, Qh1) Btm ( 51)
278: (wKa2, Qe4, Pc6; bKd1, Qc5) Btm ( 26)      352: (wKd2, Qe7, Pc5; bKg8, Qb3) Btm ( 39)
279: (wKb2, Qc5, Pc6; bKe6, Qa6) Btm ( 33)      353: (wKd2, Qc3, Pc5; bKa2, Qb5) Btm ( 33)
280: (wKb2, Qd2, Pc6; bKe4, Qe6) Btm ( 31)      354: (wKe2, Qe7, Pc5; bKg8, Qa3) Btm ( 40)
281: (wKc2, Qc7, Pc6; bKe8, Qh3) Btm ( 40)      355: (wKf2, Qe3, Pc5; bKh5, Qb8) Btm ( 40)
282: (wKc2, Qc5, Pc6; bKe6, Qh8) Btm ( 33)      356: (wKf2, Qc3, Pc5; bKa2, Qb5) Btm ( 38)
283: (wKd2, Qg4, Pc6; bKf6, Qf1) Btm ( 39)      357: (wKg2, Qd6, Pc5; bKh8, Qf7) Btm ( 46)
284: (wKe2, Qf3, Pc6; bKg7, Qd6) Btm ( 47)      358: (wKh2, Qd4, Pc5; bKe1, Qf5) Btm ( 45)
285: (wKe2, Qe4, Pc6; bKc3, Qd6) Btm ( 43)      359: (wKa1, Qb4, Pc5; bKe3, Qc2) Btm ( 47)
286: (wKf2, Qa4, Pc6; bKh3, Qd3) Btm ( 42)      360: (wKg1, Qd6, Pc5; bKh8, Qf5) Btm ( 47)
287: (wKg2, Qe6, Pc6; bKf8, Qf4) Btm ( 43)      361: (wKg1, Qf2, Pc5; bKa1, Qc3) Btm ( 53)
288: (wKg2, Qe8, Pc6; bKg7, Qf6) Btm ( 40)      362: (wKc8, Qe4, Pc4; bKf6, Qd6) Btm ( 39)
289: (wKg2, Qb5, Pc6; bKa3, Qc1) Btm ( 36)      363: (wKe8, Qd4, Pc4; bKg6, Qc7) Btm ( 51)
290: (wKg2, Qe4, Pc6; bKb3, Qc8) Btm ( 27)      364: (wKg8, Qb5, Pc4; bKa2, Qe7) Btm ( 53)
291: (wKa1, Qf3, Pc6; bKg8, Qd2) Btm ( 43)      365: (wKa7, Qb6, Pc4; bKd6, Qc6) Btm ( 29)
292: (wKa1, Qb5, Pc6; bKc2, Qe6) Btm ( 31)      366: (wKa7, Qf4, Pc4; bKg6, Qc6) Btm ( 37)
293: (wKb1, Qe6, Pc6; bKf8, Qd2) Btm ( 36)      367: (wKb7, Qb3, Pc4; bKe2, Qc5) Btm ( 67)
294: (wKb1, Qf3, Pc6; bKg7, Qd2) Btm ( 39)      368: (wKb7, Qc3, Pc4; bKd1, Qc5) Btm ( 68)
295: (wKc1, Qc3, Pc6; bKg6, Qd5) Btm ( 44)      369: (wKc7, Qc1, Pc4; bKf5, Qd3) Btm ( 56)
296: (wKd1, Qd2, Pc6; bKe4, Qc7) Btm ( 33)      370: (wKf7, Qf6, Pc4; bKh1, Qf2) Btm ( 52)
297: (wKe1, Qf3, Pc6; bKg8, Qd6) Btm ( 46)      371: (wKg7, Qb5, Pc4; bKa3, Qf1) Btm ( 53)
298: (wKe1, Qf3, Pc6; bKg6, Qd6) Btm ( 39)      372: (wKh7, Qe4, Pc4; bKg3, Qg5) Btm ( 56)
299: (wKe1, Qe4, Pc6; bKc3, Qc5) Btm ( 44)      373: (wKa6, Qc3, Pc4; bKe2, Qc5) Btm ( 69)
300: (wKe1, Qa4, Pc6; bKg3, Qd3) Btm ( 43)      374: (wKg6, Qe6, Pc4; bKf4, Qf8) Btm ( 54)
301: (wKf1, Qf6, Pc6; bKe8, Qc7) Btm ( 37)      375: (wKg6, Qb5, Pc4; bKa2, Qf1) Btm ( 54)
302: (wKf1, Qe6, Pc6; bKf8, Qc7) Btm ( 48)      376: (wKg6, Qb4, Pc4; bKa2, Qf4) Btm ( 55)
303: (wKf1, Qg6, Pc6; bKf4, Qe7) Btm ( 39)      377: (wKa5, Qf4, Pc4; bKg6, Qc6) Btm ( 44)
304: (wKf1, Qd5, Pc6; bKg4, Qe3) Btm ( 30)      378: (wKb5, Qd4, Pc4; bKe8, Qe6) Btm ( 37)
305: (wKf1, Qf3, Pc6; bKb2, Qd6) Btm ( 51)      379: (wKc5, Qb4, Pc4; bKe7, Qa6) Btm ( 38)
306: (wKg1, Qf3, Pc6; bKb2, Qe5) Btm ( 52)      380: (wKc5, Qc3, Pc4; bKd1, Qc6) Btm ( 56)
307: (wKh1, Qf3, Pc6; bKg6, Qd6) Btm ( 47)      381: (wKb4, Qc8, Pc4; bKe7, Qd3) Btm ( 38)
308: (wKh1, Qe6, Pc6; bKd2, Qg3) Btm ( 41)      382: (wKb4, Qa7, Pc4; bKe6, Qc6) Btm ( 42)
309: (wKh1, Qe4, Pc6; bKd1, Qg3) Btm ( 33)      383: (wKb4, Qf7, Pc4; bKc2, Qe4) Btm ( 68)
310: (wKa8, Qe8, Pc5; bKf5, Qc7) Btm ( 36)      384: (wKe4, Qe6, Pc4; bKf8, Qc5) Btm ( 42)
311: (wKg8, Qb6, Pc5; bKa4, Qe7) Btm ( 49)      385: (wKb3, Qd6, Pc4; bKe8, Qa5) Btm ( 42)
312: (wKg8, Qb5, Pc5; bKa3, Qe7) Btm ( 42)      386: (wKb3, Qb6, Pc4; bKe5, Qd2) Btm ( 53)
313: (wKg8, Qf7, Pc5; bKa1, Qb3) Btm ( 36)      387: (wKb3, Qh6, Pc4; bKe5, Qc5) Btm ( 54)
314: (wKf7, Qe3, Pc5; bKb2, Qc8) Btm ( 48)      388: (wKc3, Qd7, Pc4; bKf8, Qb6) Btm ( 43)
315: (wKg7, Qe3, Pc5; bKa2, Qc8) Btm ( 49)      389: (wKc3, Qc7, Pc4; bKe6, Qb1) Btm ( 40)
316: (wKa6, Qb5, Pc5; bKd8, Qc7) Btm ( 31)      390: (wKc3, Qb5, Pc4; bKf4, Qd6) Btm ( 55)
317: (wKb6, Qc6, Pc5; bKb4, Qc4) Btm ( 39)      391: (wKd3, Qc6, Pc4; bKf5, Qa5) Btm ( 53)
318: (wKb6, Qd6, Pc5; bKc4, Qe3) Btm ( 36)      392: (wKf3, Qb5, Pc4; bKh4, Qd4) Btm ( 52)
319: (wKd6, Qc6, Pc5; bKd4, Qc4) Btm ( 36)      393: (wKf3, Qb4, Pc4; bKh3, Qd4) Btm ( 54)
320: (wKd6, Qb5, Pc5; bKd4, Qa3) Btm ( 48)      394: (wKa2, Qe4, Pc4; bKg3, Qc3) Btm ( 53)
321: (wKa5, Qb8, Pc5; bKc3, Qe4) Btm ( 43)      395: (wKb2, Qf5, Pc4; bKg8, Qe3) Btm ( 44)
322: (wKb5, Qa5, Pc5; bKh5, Qd5) Btm ( 38)      396: (wKb2, Qc5, Pc4; bKg4, Qd3) Btm ( 54)
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397: (wKb2. Qb5. Pc4; bKh4. Qd3) Btm (55)
398: (wKc2. Qg5. Pc4; bKh8. Qa3) Btm (49)
399: (wKc2. Qg1. Pc4; bKh6. Qd6) Btm (52)
400: (wKc2. Qe2. Pc4; bKa2. Qf6) Btm (51)
401: (wKg2. Qd4. Pc4; bKe2. Qb8) Btm (55)
402: (wKb1. Qe4. Pc4; bKg3. Qf2) Btm (53)
403: (wKd1. Qa4. Pc4; bKf1. Qc3) Btm (74)
404: (wKf1. Qb3. Pc4; bKh2. Qd2) Btm (57)
405: (wKa8. Qf6. Pc3; bKh7. Qc7) Btm (51)
406: (wKg8. Qd2. Pc3; bKg1. Qe7) Btm (74)
407: (wKc7. Qd7. Pc3; bKh8. Qf7) Btm (45)
408: (wKd7. Qd4. Pc3; bKe2. Qa1) Btm (54)
409: (wKe7. Qe5. Pc3; bKf3. Qa1) Btm (82)
410: (wKf7. Qd4. Pc3; bKe2. Qa1) Btm (56)
411: (wKd6. Qe5. Pc3; bKb8. Qc4) Btm (7)
412: (wKe6. Qd4. Pc3; bKe2. Qb2) Btm (50)
413: (wKe5. Qa5. Pc3; bKg7. Qc8) Btm (59)
414: (wKe5. Qb4. Pc3; bKa1. Qb3) Btm (52)
415: (wKb4. Qd7. Pc3; bKf8. Qe1) Btm (44)
416: (wKb4. Qd8. Pc3; bKf7. Qe1) Btm (47)
417: (wKc4. Qg4. Pc3; bKe1. Qe3) Btm (91)
418: (wKf4. Qc7. Pc3; bKg6. Qd3) Btm (61)
419: (wKa3. Qe5. Pc3; bKf7. Qc4) Btm (56)
420: (wKa3. Qd2. Pc3; bKa1. Qb1) Btm (2)
421: (wKb3. Qc7. Pc3; bKe6. Qd2) Btm (51)
422: (wKb3. Qc4. Pc3; bKf6. Qa5) Btm (53)
423: (wKb3. Qb6. Pc3; bKd5. Qg3) Btm (48)
424: (wKb3. Qa6. Pc3; bKe5. Qc5) Btm (56)
425: (wKd3. Qf6. Pc3; bKg8. Qa2) Btm (64)
426: (wKd3. Qf5. Pc3; bKg7. Qa3) Btm (58)
427: (wKe3. Qf4. Pc3; bKg6. Qd7) Btm (62)
428: (wKb2. Qg5. Pc3; bKh7. Qc4) Btm (59)
429: (wKb2. Qd5. Pc3; bKe3. Qa4) Btm (62)
430: (wKb2. Qf5. Pc3; bKd2. Qa4) Btm (63)
431: (wKb2. Qg2. Pc3; bKe1. Qe5) Btm (67)
432: (wKb2. Qg2. Pc3; bKe1. Qc4) Btm (66)
433: (wKc2. Qe7. Pc3; bKg8. Qb5) Btm (61)
434: (wKc2. Qc4. Pc3; bKg7. Qa5) Btm (58)
435: (wKc2. Qf7. Pc3; bKg5. Qd6) Btm (62)
436: (wKc2. Qf6. Pc3; bKg4. Qd5) Btm (85)
437: (wKc2. Qa3. Pc3; bKf2. Qd5) Btm (89)
438: (wKd2. Qg5. Pc3; bKh7. Qc4) Btm (61)
439: (wKd2. Qf7. Pc3; bKg5. Qa6) Btm (67)
440: (wKf2. Qb4. Pc3; bKh3. Qd3) Btm (75)
441: (wKb1. Qd5. Pc3; bKh4. Qf2) Btm (65)
442: (wKc1. Qg2. Pc3; bKh7. Qd7) Btm (63)
443: (wKc1. Qd5. Pc3; bKg4. Qf2) Btm (64)
444: (wKc1. Qf6. Pc3; bKg3. Qd5) Btm (86)
445: (wKc1. Qb4. Pc3; bKa1. Qa2) Btm (2)
446: (wKc1. Qd1. Pc3; bKa1. Qe4) Btm (4)
447: (wKf1. Qf2. Pc3; bKh1. Qf4) Btm (70)
448: (wKd8. Qf5. Pc2; bKg2. Qc4) Btm (81)
449: (wKa7. Qc3. Pc2; bKg4. Qd6) Btm (62)
450: (wKb7. Qc3. Pc2; bKf4. Qd6) Btm (61)
451: (wKc7. Qb6. Pc2; bKe7. Qd5) Btm (42)
452: (wKf7. Qe4. Pc2; bKg5. Qc3) Btm (58)
453: (wKb6. Qd2. Pc2; bKf3. Qc4) Btm (63)
454: (wKf6. Qc4. Pc2; bKf2. Qe3) Btm (70)
455: (wKg6. Qg5. Pc2; bKh1. Qg3) Btm (72)
456: (wKh6. Qc5. Pc2; bKh1. Qe4) Btm (74)
457: (wKa3. Qf5. Pc2; bKg7. Qc4) Btm (63)
458: (wKb3. Qd7. Pc2; bKf6. Qc5) Btm (57)
459: (wKb3. Qc3. Pc2; bKb1. Qc1) Btm (1)
460: (wKd3. Qc3. Pc2; bKd1. Qc1) Btm (2)
461: (wKa2. Qe4. Pc2; bKf2. Qc3) Btm (63)
462: (wKb2. Qc7. Pc2; bKd4. Qg2) Btm (59)
463: (wKb2. Qb5. Pc2; bKd4. Qh2) Btm (62)
464: (wKb1. Qe5. Pc2; bKg4. Qa3) Btm (69)
465: (wKb1. Qd4. Pc2; bKf3. Qa3) Btm (62)
466: (wKb1. Qe1. Pc2; bKf3. Qa3) Btm (72)
467: (wKb1. Qe4. Pc2; bKg3. Qc3) Btm (64)
468: (wKb1. Qc4. Pc2; bKd2. Qf5) Btm (66)
469: (wKb1. Qe4. Pc2; bKd2. Qc3) Btm (60)
470: (wKb1. Qb4. Pc2; bKe2. Qd8) Btm (65)

471: (wKb1. Qe6. Pc2; bKf2. Qc3) Btm (70)
472: (wKb1. Qg4. Pc2; bKe1. Qc3) Btm (71)
473: (wKc1. Qd5. Pc2; bKf4. Qb6) Btm (64)
474: (wKc1. Qf5. Pc2; bKg3. Qd4) Btm (75)
475: (wKc1. Qe4. Pc2; bKf2. Qc3) Btm (66)
476: (wKe1. Qf2. Pc2; bKh1. Qg3) Btm (67)
477: (wKa8. Qe6. Pd7; bKc5. Qc7) Btm (4)
478: (wKc8. Qe7. Pd7; bKg6. Qf5) Btm (21)
479: (wKd8. Qb3. Pd7; bKc5. Qe4) Btm (11)
480: (wKd8. Qc7. Pd7; bKd5. Qa6) Btm (11)
481: (wKe8. Qd5. Pd7; bKa7. Qa4) Btm (3)
482: (wKe8. Qd8. Pd7; bKe6. Qd6) Btm (6)
483: (wKa7. Qg7. Pd7; bKa4. Qd1) Btm (16)
484: (wKh7. Qh3. Pd7; bKe5. Qd1) Btm (8)
485: (wKf6. Qc2. Pd7; bKf6. Qd4) Btm (11)
486: (wKe4. Qe5. Pd7; bKa6. Qb6) Btm (14)
487: (wKd3. Qc6. Pd7; bKb8. Qd8) Btm (9)
488: (wKa2. Qb5. Pd7; bKa8. Qd8) Btm (6)
489: (wKe2. Qe5. Pd7; bKa6. Qb6) Btm (3)
490: (wKh2. Qh3. Pd7; bKg5. Qd4) Btm (18)
491: (wKb1. Qc6. Pd7; bKb8. Qd8) Btm (8)
492: (wKb1. Qc6. Pd7; bKb3. Qb8) Btm (13)
493: (wKd1. Qg7. Pd7; bKd3. Qd6) Btm (26)
494: (wKd1. Qc6. Pd7; bKb8. Qd8) Btm (10)
495: (wKf1. Qe6. Pd7; bKf8. Qd8) Btm (9)
496: (wKf1. Qd6. Pd7; bKf7. Qd8) Btm (9)
497: (wKf1. Qc6. Pd7; bKg7. Qd8) Btm (16)
498: (wKf1. Qd4. Pd7; bKg6. Qd8) Btm (10)
499: (wKh1. Qg1. Pd7; bKe2. Qf6) Btm (23)
500: (wKh1. Qf5. Pd7; bKe1. Qg3) Btm (12)
501: (wKb8. Qe7. Pd6; bKf5. Qd5) Btm (60)
502: (wKb8. Qe5. Pd6; bKc4. Qc6) Btm (15)
503: (wKf8. Qf7. Pd6; bKh8. Qf5) Btm (46)
504: (wKf8. Qd5. Pd6; bKf6. Qg6) Btm (56)
505: (wKf8. Qf4. Pd6; bKg6. Qe6) Btm (17)
506: (wKf8. Qc5. Pd6; bKe4. Qe6) Btm (18)
507: (wKg8. Qg4. Pd6; bKf6. Qh6) Btm (8)
508: (wKd7. Qa8. Pd6; bKb6. Qe1) Btm (12)
509: (wKd7. Qe6. Pd6; bKc5. Qd2) Btm (36)
510: (wKe7. Qd7. Pd6; bKe5. Qd5) Btm (13)
511: (wKa6. Qb5. Pd6; bKa8. Qe4) Btm (2)
512: (wKb6. Qb5. Pd6; bKb8. Qc8) Btm (5)
513: (wKb6. Qc7. Pd6; bKe8. Qd8) Btm (8)
514: (wKb6. Qf8. Pd6; bKg6. Qd7) Btm (49)
515: (wKc6. Qh3. Pd6; bKd8. Qg7) Btm (3)
516: (wKe6. Qa6. Pd6; bKc5. Qg7) Btm (17)
517: (wKa5. Qe6. Pd6; bKg5. Qc6) Btm (58)
518: (wKa5. Qh5. Pd6; bKf4. Qc6) Btm (26)
519: (wKb5. Qe3. Pd6; bKf5. Qa8) Btm (46)
520: (wKc5. Qb5. Pd6; bKf7. Qe6) Btm (59)
521: (wKe5. Qc6. Pd6; bKa5. Qg6) Btm (24)
522: (wKf5. Qc6. Pd6; bKa5. Qh6) Btm (23)
523: (wKf5. Qc6. Pd6; bKd4. Qh6) Btm (17)
524: (wKh5. Qb4. Pd6; bKf3. Qg7) Btm (31)
525: (wKb4. Qc7. Pd6; bKf8. Qf5) Btm (54)
526: (wKb4. Qe7. Pd6; bKg8. Qf5) Btm (37)
527: (wKc4. Qf6. Pd6; bKg8. Qa5) Btm (37)
528: (wKf4. Qd7. Pd6; bKh6. Qd5) Btm (45)
529: (wKf4. Qb6. Pd6; bKh5. Qd5) Btm (35)
530: (wKf4. Qa6. Pd6; bKh4. Qd5) Btm (48)
531: (wKg4. Qf5. Pd6; bKf7. Qf6) Btm (4)
532: (wKg4. Qb6. Pd6; bKa4. Qf6) Btm (21)
533: (wKh4. Qe7. Pd6; bKh8. Qf5) Btm (31)
534: (wKe3. Qa3. Pd6; bKc2. Qc4) Btm (28)
535: (wKf3. Qb6. Pd6; bKa4. Qe5) Btm (22)
536: (wKg3. Qb6. Pd6; bKa4. Qe4) Btm (23)
537: (wKf2. Qb6. Pd6; bKa4. Qd3) Btm (24)
538: (wKg2. Qh2. Pd6; bKa2. Qf5) Btm (36)
539: (wKg2. Qh2. Pd6; bKc2. Qf5) Btm (50)
540: (wKc1. Qb6. Pd6; bKa3. Qe2) Btm (23)
541: (wKe1. Qh6. Pd6; bKg4. Qf7) Btm (29)
542: (wKf1. Qa3. Pd6; bKh2. Qd2) Btm (36)
543: (wKg1. Qc7. Pd6; bKh3. Qf5) Btm (34)
544: (wKa8. Qd6. Pd5; bKa5. Qc3) Btm (27)

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545: (wKa8. Qe4. Pd5: bKc3. Qb5) Btm ( 39)
546: (wKb8. Qb3. Pd5: bKe2. Qc5) Btm ( 66)
547: (wKc8. Qd6. Pd5: bKa5. Qb2) Btm ( 20)
548: (wKd8. Qg5. Pd5: bKh7. Qe4) Btm ( 37)
549: (wKe8. Qf7. Pd5: bKh8. Qg6) Btm ( 40)
550: (wKg8. Qd8. Pd5: bKg6. Qa6) Btm ( 59)
551: (wKg8. Qc5. Pd5: bKa4. Qf5) Btm ( 42)
552: (wKg8. Qc4. Pd5: bKe3. Qf5) Btm ( 40)
553: (wKa6. Qe5. Pd5: bKd3. Qc5) Btm ( 42)
554: (wKc6. Qd6. Pd5: bKc4. Qd4) Btm ( 32)
555: (wKc6. Qe6. Pd5: bKd4. Qf3) Btm ( 35)
556: (wKe6. Qd6. Pd5: bKe4. Qd4) Btm ( 34)
557: (wKe6. Qc5. Pd5: bKe4. Qb3) Btm ( 37)
558: (wKe6. Qd2. Pd5: bKe4. Qb3) Btm ( 61)
559: (wKb5. Qf7. Pd5: bKg5. Qd6) Btm ( 45)
560: (wKc5. Qb8. Pd5: bKf7. Qd7) Btm ( 64)
561: (wKc5. Qe2. Pd5: bKf7. Qf6) Btm ( 64)
562: (wKa4. Qb3. Pd5: bKa1. Qc2) Btm ( 29)
563: (wKc4. Qf8. Pd5: bKg6. Qe3) Btm ( 61)
564: (wKe4. Qd8. Pd5: bKg6. Qg7) Btm ( 63)
565: (wKf4. Qc5. Pd5: bKd3. Qh5) Btm ( 40)
566: (wKg4. Qg5. Pd5: bKh8. Qf7) Btm ( 65)
567: (wKa3. Qb3. Pd5: bKa1. Qd3) Btm ( 34)
568: (wKf3. Qb5. Pd5: bKa3. Qd4) Btm ( 31)
569: (wKh3. Qf7. Pd5: bKg1. Qg5) Btm ( 45)
570: (wKc2. Qh5. Pd5: bKg3. Qf6) Btm ( 39)
571: (wKe2. Qb5. Pd5: bKa3. Qf4) Btm ( 33)
572: (wKg2. Qd6. Pd5: bKb3. Qb7) Btm ( 37)
573: (wKd1. Qd4. Pd5: bKb3. Qd6) Btm ( 31)
574: (wKf1. Qb3. Pd5: bKh2. Qd2) Btm ( 42)
575: (wKg1. Qg5. Pd5: bKa1. Qc3) Btm ( 55)
576: (wKg1. Qg5. Pd5: bKb1. Qe4) Btm ( 49)
577: (wKb8. Qd6. Pd4: bKb5. Qf2) Btm ( 34)
578: (wKc8. Qa4. Pd4: bKh8. Qe4) Btm ( 62)
579: (wKd8. Qd5. Pd4: bKb4. Qa7) Btm ( 40)
580: (wKd8. Qd5. Pd4: bKf4. Qg7) Btm ( 44)
581: (wKf8. Qb6. Pd4: bKh7. Qd7) Btm ( 62)
582: (wKa7. Qd7. Pd4: bKa5. Qf8) Btm ( 35)
583: (wKb7. Qe5. Pd4: bKf8. Qa2) Btm ( 62)
584: (wKb7. Qe4. Pd4: bKf8. Qa1) Btm ( 63)
585: (wKc7. Qd6. Pd4: bKa5. Qb3) Btm ( 32)
586: (wKd7. Qf6. Pd4: bKb5. Qg1) Btm ( 36)
587: (wKb6. Qe5. Pd4: bKf7. Qa2) Btm ( 63)
588: (wKd6. Qe5. Pd4: bKb8. Qc4) Btm (  7)
589: (wKc5. Qe5. Pd4: bKa5. Qd7) Btm ( 32)
590: (wKc5. Qf6. Pd4: bKc3. Qe3) Btm ( 57)
591: (wKd5. Qc7. Pd4: bKg8. Qa4) Btm ( 75)
592: (wKd5. Qc4. Pd4: bKf7. Qb6) Btm ( 59)
593: (wKb4. Qf6. Pd4: bKg4. Qd5) Btm ( 62)
594: (wKc4. Qd6. Pd4: bKg7. Qa5) Btm ( 66)
595: (wKe4. Qc5. Pd4: bKb3. Qa4) Btm ( 52)
596: (wKf4. Qc4. Pd4: bKa3. Qe1) Btm ( 51)
597: (wKc3. Qb5. Pd4: bKg4. Qf6) Btm ( 69)
598: (wKc3. Qc4. Pd4: bKg3. Qf6) Btm ( 70)
599: (wKf3. Qc4. Pd4: bKd2. Qh4) Btm ( 62)
600: (wKh3. Qg3. Pd4: bKh1. Qe3) Btm ( 69)
601: (wKa2. Qf4. Pd4: bKg2. Qb4) Btm ( 61)
602: (wKb2. Qc3. Pd4: bKe2. Qe6) Btm ( 62)
603: (wKf2. Qd3. Pd4: bKb2. Qd5) Btm ( 67)
604: (wKc1. Qf4. Pd4: bKa1. Qd3) Btm ( 67)
605: (wKe1. Qb4. Pd4: bKg1. Qd3) Btm ( 66)
606: (wKe1. Qf2. Pd4: bKh1. Qg3) Btm ( 60)
607: (wKf1. Qf2. Pd4: bKh1. Qf4) Btm ( 61)
608: (wKg1. Qf2. Pd4: bKa1. Qb3) Btm ( 67)
609: (wKb8. Qd4. Pd3: bKh3. Qc6) Btm ( 69)
610: (wKf8. Qe7. Pd3: bKh8. Qd4) Btm ( 71)
611: (wKf7. Qb5. Pd3: bKh6. Qd6) Btm ( 78)
612: (wKg6. Qe4. Pd3: bKg3. Qc2) Btm ( 76)
613: (wKg6. Qd5. Pd3: bKf2. Qc3) Btm ( 77)
614: (wKc5. Qd4. Pd3: bKa7. Qe6) Btm (  7)
615: (wKd5. Qc4. Pd3: bKf7. Qb8) Btm ( 71)
616: (wKd5. Qa4. Pd3: bKb1. Qb6) Btm ( 67)
617: (wKh5. Qf5. Pd3: bKg2. Qc2) Btm ( 67)
618: (wKa4. Qd6. Pd3: bKf5. Qb7) Btm ( 68)
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619: (wKd4. Qf3. Pd3: bKh2. Qc8) Btm ( 90)
620: (wKc3. Qc6. Pd3: bKe5. Qh3) Btm ( 59)
621: (wKe3. Qa6. Pd3: bKd1. Qb3) Btm ( 76)
622: (wKc2. Qd4. Pd3: bKf1. Qf5) Btm ( 69)
623: (wKd2. Qh4. Pd3: bKg2. Qf8) Btm ( 77)
624: (wKd1. Qe4. Pd3: bKf2. Qe3) Btm ( 61)
625: (wKd8. Qd5. Pd2: bKa3. Qa7) Btm ( 55)
626: (wKd8. Qd5. Pd2: bKg3. Qg7) Btm ( 79)
627: (wKb7. Qd3. Pd2: bKh2. Qc5) Btm ( 73)
628: (wKf7. Qe6. Pd2: bKh7. Qd3) Btm ( 58)
629: (wKf6. Qe3. Pd2: bKa2. Qc1) Btm ( 50)
630: (wKd5. Qd3. Pd2: bKa5. Qe1) Btm ( 33)
631: (wKb4. Qd6. Pd2: bKe4. Qe8) Btm ( 79)
632: (wKc4. Qg5. Pd2: bKf1. Qf2) Btm ( 89)
633: (wKd4. Qg5. Pd2: bKh3. Qc8) Btm ( 87)
634: (wKc3. Qd3. Pd2: bKa3. Qe6) Btm ( 48)
635: (wKc3. Qd3. Pd2: bKc1. Qd1) Btm (  2)
636: (wKe3. Qf4. Pd2: bKh3. Qb5) Btm ( 74)
637: (wKe3. Qd3. Pd2: bKe1. Qd1) Btm (  2)
638: (wKc2. Qd4. Pd2: bKa3. Qh1) Btm (  5)
639: (wKc2. Qc6. Pd2: bKh2. Qd4) Btm ( 76)
640: (wKe1. Qf3. Pd2: bKh2. Qb4) Btm ( 72)
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C The same list sorted by depth - the right-most number.
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201: (wKc2. Qc3. Pb3: bKa2. Qa3) Btm (  1)
459: (wKb3. Qc3. Pc2: bKb1. Qc1) Btm (  1)
  5: (wKa3. Qf7. Pa7: bKc8. Qa8) Btm (  2)
  7: (wKa1. Qh7. Pa7: bKc8. Qa8) Btm (  2)
 94: (wKc5. Qc6. Pb6: bKa5. Qa6) Btm (  2)
156: (wKc4. Qc5. Pb5: bKa4. Qa5) Btm (  2)
189: (wKc3. Qc4. Pb4: bKa3. Qa4) Btm (  2)
212: (wKd7. Qd3. Pc7: bKa7. Qc5) Btm (  2)
214: (wKd6. Qd8. Pc7: bKb7. Qc8) Btm (  2)
228: (wKg1. Qg2. Pc7: bKf4. Qc3) Btm (  2)
420: (wKa3. Qd2. Pc3: bKa1. Qb1) Btm (  2)
445: (wKc1. Qb4. Pc3: bKa1. Qa2) Btm (  2)
460: (wKd3. Qc3. Pc2: bKd1. Qc1) Btm (  2)
511: (wKa6. Qb5. Pd6: bKa8. Qe4) Btm (  2)
635: (wKc3. Qd3. Pd2: bKc1. Qd1) Btm (  2)
637: (wKe3. Qd3. Pd2: bKe1. Qd1) Btm (  2)
  2: (wKb8. Qa8. Pa7: bKb6. Qa6) Btm (  3)
 66: (wKb3. Qg7. Pb7: bKd8. Qb8) Btm (  3)
 70: (wKa1. Qe3. Pb7: bKa4. Qa5) Btm (  3)
 75: (wKe1. Qg7. Pb7: bKd8. Qb8) Btm (  3)
 76: (wKf1. Qf7. Pb7: bKd8. Qb8) Btm (  3)
 85: (wKa6. Qh1. Pb6: bKb8. Qg7) Btm (  3)
226: (wKg1. Qg7. Pc7: bKe8. Qc8) Btm (  3)
481: (wKe8. Qd5. Pd7: bKa7. Qa4) Btm (  3)
489: (wKe2. Qe5. Pd7: bKa6. Qb6) Btm (  3)
515: (wKc6. Qh3. Pd6: bKd8. Qg7) Btm (  3)
248: (wKa6. Qh1. Pc6: bKa8. Qf6) Btm (  4)
446: (wKc1. Qd1. Pc3: bKa1. Qe4) Btm (  4)
477: (wKa8. Qe6. Pd7: bKc5. Qc7) Btm (  4)
531: (wKg4. Qf5. Pd6: bKf7. Qf0) Btm (  4)
  9: (wKg1. Qf2. Pa7: bKb5. Qa3) Btm (  5)
 71: (wKb1. Qc6. Pb7: bKd8. Qb8) Btm (  5)
 77: (wKh1. Qg2. Pb7: bKc5. Qb3) Btm (  5)
512: (wKb6. Qb5. Pd6: bKb8. Qc8) Btm (  5)
638: (wKc2. Qd4. Pd2: bKa3. Qh1) Btm (  5)
 44: (wKc1. Qd3. Pa6: bKa2. Qa7) Btm (  6)
 58: (wKa8. Qb4. Pb7: bKa6. Qc6) Btm (  6)
209: (wKd8. Qc8. Pc7: bKd6. Qc6) Btm (  6)
482: (wKe8. Qd8. Pd7: bKe6. Qd6) Btm (  6)
488: (wKa2. Qb5. Pd7: bKa8. Qd8) Btm (  6)
 65: (wKh4. Qe7. Pb7: bKh1. Qb1) Btm (  7)
411: (wKd6. Qe5. Pc3: bKb8. Qc4) Btm (  7)
588: (wKd6. Qe5. Pd4: bKb8. Qc4) Btm (  7)
614: (wKc5. Qd4. Pd3: bKa7. Qe6) Btm (  7)
  6: (wKa2. Qb2. Pa7: bKc4. Qf3) Btm (  8)
 61: (wKc8. Qb8. Pb7: bKc6. Qb6) Btm (  8)
484: (wKh7. Qh3. Pd7: bKe5. Qd1) Btm (  8)
491: (wKb1. Qc6. Pd7: bKb8. Qd8) Btm (  8)
507: (wKg8. Qg4. Pd6: bKf6. Qh6) Btm (  8)
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513: (wKb6. Qc7. Pd6: bKe8. Qd8) Btm (  8)      224: (wKh2. Qd6. Pc7: bKb5. Qg4) Btm ( 24)
203: (wKd6. Qe5. Pb2: bKb8. Qc4) Btm (  9)      229: (wKh1. Qh2. Pc7: bKg5. Qc3) Btm ( 24)
487: (wKd3. Qc6. Pd7: bKb8. Qd8) Btm (  9)      243: (wKd7. Qc3. Pc6: bKd5. Qa4) Btm ( 24)
495: (wKf1. Qe6. Pd7: bKf8. Qd8) Btm (  9)      276: (wKa2. Qb5. Pc6: bKd4. Qh7) Btm ( 24)
496: (wKf1. Qd6. Pd7: bKf7. Qd8) Btm (  9)      521: (wKe5. Qc6. Pd6: bKa5. Qg6) Btm ( 24)
208: (wKc8. Qg6. Pc7: bKa5. Qd5) Btm ( 10)      537: (wKf2. Qb6. Pd6: bKa4. Qd3) Btm ( 24)
213: (wKh7. Qg7. Pc7: bKf5. Qe8) Btm ( 10)      266: (wKa3. Qb3. Pc6: bKa1. Qd3) Btm ( 25)
494: (wKd1. Qc6. Pd7: bKb8. Qd8) Btm ( 10)      230: (wKh1. Qh2. Pc7: bKg4. Qc4) Btm ( 26)
498: (wKf1. Qd4. Pd7: bKg6. Qd8) Btm ( 10)      256: (wKh5. Qg6. Pc6: bKf4. Qd8) Btm ( 26)
 67: (wKb3. Qc3. Pb7: bKh1. Qg3) Btm ( 11)      278: (wKa2. Qe4. Pc6: bKd1. Qc5) Btm ( 26)
479: (wKd8. Qb3. Pd7: bKc5. Qe4) Btm ( 11)      493: (wKb1. Qg7. Pd7: bKd3. Qd6) Btm ( 26)
480: (wKd8. Qc7. Pd7: bKd5. Qa6) Btm ( 11)      518: (wKa5. Qh5. Pd6: bKf4. Qc6) Btm ( 26)
485: (wKc6. Qc2. Pd7: bKf6. Qd4) Btm ( 11)      241: (wKb7. Qc8. Pc6: bKb5. Qe4) Btm ( 27)
 57: (wKa8. Qd7. Pb7: bKa6. Qe4) Btm ( 12)      265: (wKh4. Qd4. Pc6: bKf3. Qg8) Btm ( 27)
 69: (wKg3. Qf3. Pb7: bKa1. Qb3) Btm ( 12)      290: (wKg2. Qe4. Pc6: bKb3. Qc8) Btm ( 27)
 73: (wKd1. Qc6. Pb7: bKd8. Qb8) Btm ( 12)      544: (wKa8. Qd6. Pd5: bKa5. Qc3) Btm ( 27)
220: (wKd4. Qc8. Pc7: bKa1. Qc6) Btm ( 12)       30: (wKa4. Qd3. Pa6: bKe6. Qh8) Btm ( 28)
500: (wKh1. Qf5. Pd7: bKe1. Qg3) Btm ( 12)      247: (wKa6. Qf3. Pc6: bKa8. Qd6) Btm ( 28)
508: (wKd7. Qa8. Pd6: bKb6. Qe1) Btm ( 12)      534: (wKe3. Qa3. Pd6: bKc2. Qc4) Btm ( 28)
 62: (wKe8. Qa6. Pb7: bKb4. Qc7) Btm ( 13)       31: (wKa4. Qb4. Pa6: bKc2. Qe3) Btm ( 29)
492: (wKb1. Qc6. Pd7: bKb3. Qd8) Btm ( 13)       32: (wKe4. Qc4. Pa6: bKh4. Qa3) Btm ( 29)
510: (wKe7. Qd7. Pd6: bKe5. Qd5) Btm ( 13)       83: (wKf7. Qg4. Pb6: bKe3. Qb5) Btm ( 29)
 74: (wKd1. Qb6. Pb7: bKd7. Qd8) Btm ( 14)      103: (wKe3. Qb1. Pb6: bKc3. Qa6) Btm ( 29)
235: (wKa8. Qd5. Pc6: bKb4. Qb6) Btm ( 14)      246: (wKa6. Qa3. Pc6: bKa8. Qd8) Btm ( 29)
486: (wKe4. Qe5. Pd7: bKa6. Qb6) Btm ( 14)      251: (wKh6. Qg6. Pc6: bKf4. Qe7) Btm ( 29)
 64: (wKg6. Qa6. Pb7: bKb4. Qc7) Btm ( 15)      260: (wKb4. Qc5. Pc6: bKe6. Qa6) Btm ( 29)
236: (wKc8. Qd8. Pc6: bKa8. Qb4) Btm ( 15)      271: (wKb3. Qd2. Pc6: bKe4. Qc7) Btm ( 29)
242: (wKd7. Qc7. Pc6: bKd5. Qc5) Btm ( 15)      365: (wKa7. Qb6. Pc4: bKd6. Qc6) Btm ( 29)
502: (wKb8. Qe5. Pd6: bKc4. Qc6) Btm ( 15)      541: (wKe1. Qh6. Pd6: bKg4. Qf7) Btm ( 29)
 72: (wKb1. Qb6. Pb7: bKd7. Qb8) Btm ( 16)      562: (wKa4. Qb3. Pd5: bKa1. Qc2) Btm ( 29)
110: (wKc2. Qd4. Pb6: bKa3. Qb7) Btm ( 16)       56: (wKa8. Qa7. Pb7: bKc7. Qd5) Btm ( 30)
225: (wKf1. Qf2. Pc7: bKd3. Qg4) Btm ( 16)      253: (wKb5. Qa5. Pc6: bKe7. Qd6) Btm ( 30)
231: (wKh1. Qd6. Pc7: bKf1. Qc1) Btm ( 16)      254: (wKb5. Qb4. Pc6: bKd5. Qe3) Btm ( 30)
239: (wKf8. Qb6. Pc6: bKa4. Qe6) Btm ( 16)      304: (wKf1. Qd5. Pc6: bKg4. Qe3) Btm ( 30)
483: (wKa7. Qg7. Pd7: bKa4. Qd1) Btm ( 16)        3: (wKh8. Qh7. Pa7: bKg5. Qc6) Btm ( 31)
497: (wKf1. Qc6. Pd7: bKg7. Qd8) Btm ( 16)       10: (wKg1. Qd7. Pa7: bKe1. Qe4) Btm ( 31)
 21: (wKa7. Qb6. Pa6: bKc4. Qc8) Btm ( 17)      232: (wKa8. Qe8. Pc6: bKf6. Qc7) Btm ( 31)
 60: (wKb8. Qg5. Pb7: bKb4. Qe6) Btm ( 17)      264: (wKg4. Qe4. Pc6: bKb3. Qc5) Btm ( 31)
 63: (wKh7. Qg6. Pb7: bKa1. Qc2) Btm ( 17)      269: (wKb3. Qc5. Pc6: bKe6. Qa8) Btm ( 31)
 68: (wKf3. Qb6. Pb7: bKd7. Qb8) Btm ( 17)      280: (wKb2. Qd2. Pc6: bKe4. Qe6) Btm ( 31)
168: (wKc2. Qd4. Pb5: bKa3. Qh1) Btm ( 17)      292: (wKa1. Qb5. Pc6: bKc2. Qe6) Btm ( 31)
505: (wKf8. Qf4. Pd6: bKg6. Qe6) Btm ( 17)      316: (wKa6. Qb6. Pc5: bKd8. Qc7) Btm ( 31)
516: (wKe6. Qa6. Pd6: bKc5. Qg7) Btm ( 17)      524: (wKh5. Qb4. Pd6: bKf3. Qg7) Btm ( 31)
523: (wKf5. Qc6. Pd6: bKd4. Qh6) Btm ( 17)      533: (wKh4. Qe7. Pd6: bKh8. Qf5) Btm ( 31)
 88: (wKd6. Qd8. Pb6: bKd4. Qb7) Btm ( 18)      568: (wKf3. Qb5. Pd5: bKa3. Qd4) Btm ( 31)
216: (wKb5. Qc8. Pc7: bKc1. Qd6) Btm ( 18)      573: (wKd1. Qd4. Pd5: bKb3. Qd6) Btm ( 31)
490: (wKh2. Qh3. Pd7: bKg5. Qd4) Btm ( 18)      109: (wKb2. Qc5. Pb6: bKh2. Qa6) Btm ( 32)
506: (wKf8. Qc5. Pd6: bKe4. Qe6) Btm ( 18)      133: (wKe8. Qf7. Pb5: bKh8. Qg6) Btm ( 32)
  8: (wKf1. Qc5. Pa7: bKh4. Qe4) Btm ( 19)      233: (wKa8. Qe4. Pc6: bKf6. Qb6) Btm ( 32)
 59: (wKa8. Qg1. Pb7: bKf4. Qd5) Btm ( 19)      326: (wKb4. Qd5. Pc5: bKe7. Qa6) Btm ( 32)
215: (wKa5. Qc8. Pc7: bKc1. Qc6) Btm ( 19)      332: (wKh4. Qd6. Pc5: bKh8. Qg6) Btm ( 32)
547: (wKc8. Qd6. Pd5: bKa5. Qb2) Btm ( 20)      554: (wKc6. Qd6. Pd5: bKc4. Qd4) Btm ( 32)
 20: (wKa7. Qb4. Pa6: bKd5. Qe8) Btm ( 21)      585: (wKc7. Qd6. Pd4: bKa5. Qb3) Btm ( 32)
217: (wKa4. Qc8. Pc7: bKf4. Qc5) Btm ( 21)      589: (wKc5. Qe5. Pd4: bKa5. Qd7) Btm ( 32)
261: (wKc4. Qe4. Pc6: bKa4. Qd6) Btm ( 21)       15: (wKf8. Qb5. Pa6: bKd4. Qe6) Btm ( 33)
478: (wKc8. Qe7. Pd7: bKg6. Qf5) Btm ( 21)       34: (wKh4. Qd3. Pa6: bKe6. Qc6) Btm ( 33)
532: (wKg4. Qb6. Pd6: bKa4. Qf6) Btm ( 21)       36: (wKb3. Qd6. Pa6: bKe8. Qe4) Btm ( 33)
 29: (wKg5. Qg4. Pa6: bKg8. Qc7) Btm ( 22)       38: (wKf3. Qc4. Pa6: bKa3. Qa7) Btm ( 33)
218: (wKa4. Qf4. Pc7: bKc2. Qc5) Btm ( 22)      116: (wKh2. Qf6. Pb6: bKe1. Qg4) Btm ( 33)
535: (wKf3. Qb6. Pd6: bKa4. Qe5) Btm ( 22)      160: (wKb3. Qc6. Pb5: bKd4. Qc5) Btm ( 33)
210: (wKf8. Qf7. Pc7: bKh8. Qf5) Btm ( 23)      237: (wKc8. Qe8. Pc6: bKa8. Qf4) Btm ( 33)
219: (wKa4. Qc8. Pc7: bKf2. Qc5) Btm ( 23)      238: (wKf8. Qf3. Pc6: bKg5. Qe6) Btm ( 33)
221: (wKd4. Qc8. Pc7: bKe1. Qc6) Btm ( 23)      249: (wKa6. Qa8. Pc6: bKe7. Qc7) Btm ( 33)
223: (wKa2. Qc8. Pc7: bKe1. Qe3) Btm ( 23)      259: (wKa4. Qe4. Pc6: bKf6. Qc5) Btm ( 33)
227: (wKg1. Qd6. Pc7: bKb5. Qf5) Btm ( 23)      262: (wKe4. Qd1. Pc6: bKe7. Qa7) Btm ( 33)
277: (wKa2. Qb5. Pc6: bKd4. Qf3) Btm ( 23)      268: (wKb3. Qa6. Pc6: bKg7. Qc5) Btm ( 33)
499: (wKh1. Qg1. Pd7: bKe2. Qf6) Btm ( 23)      270: (wKb3. Qh7. Pc6: bKf6. Qg4) Btm ( 33)
522: (wKf5. Qc6. Pd6: bKa5. Qh6) Btm ( 23)      279: (wKb2. Qc5. Pc6: bKe6. Qa6) Btm ( 33)
536: (wKg3. Qb6. Pd6: bKa4. Qe4) Btm ( 23)      282: (wKc2. Qc5. Pc6: bKe6. Qc7) Btm ( 33)
540: (wKc1. Qb6. Pd6: bKa3. Qe2) Btm ( 23)      296: (wKd1. Qd2. Pc6: bKe4. Qc7) Btm ( 33)
  4: (wKh6. Qh7. Pa7: bKe6. Qa8) Btm ( 24)      309: (wKh1. Qe4. Pc6: bKd1. Qg3) Btm ( 33)
 45: (wKe1. Qf1. Pa6: bKa1. Qa4) Btm ( 24)      353: (wKd2. Qc3. Pc5: bKa2. Qb5) Btm ( 33)
211: (wKf8. Qa7. Pc7: bKh6. Qe6) Btm ( 24)      571: (wKe2. Qb5. Pd5: bKa3. Qf4) Btm ( 33)
222: (wKc3. Qc8. Pc7: bKg7. Qa4) Btm ( 24)      630: (wKd5. Qd3. Pd2: bKa5. Qe1) Btm ( 33)
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257: (wKh5. Qe4. Pc6: bKc3. Qg3) Btm ( 34)      89: (wKf6. Qa6. Pb6: bKh6. Qe8) Btm ( 40)
267: (wKa3. Qc7. Pc6: bKc1. Qc4) Btm ( 34)     108: (wKb2. Qc2. Pb6: bKd4. Qf3) Btm ( 40)
543: (wKg1. Qc7. Pd6: bKh3. Qf5) Btm ( 34)     153: (wKd5. Qc3. Pb5: bKa2. Qh6) Btm ( 40)
556: (wKe6. Qd6. Pd5: bKe4. Qd4) Btm ( 34)     263: (wKg4. Qe4. Pc6: bKf8. Qd6) Btm ( 40)
567: (wKa3. Qb3. Pd5: bKa1. Qd3) Btm ( 34)     281: (wKc2. Qc7. Pc6: bKe8. Qh3) Btm ( 40)
577: (wKb8. Qd6. Pd4: bKb5. Qf2) Btm ( 34)     288: (wKg2. Qe8. Pc6: bKg7. Qf6) Btm ( 40)
 90: (wKg6. Qf6. Pb6: bKe4. Qd7) Btm ( 35)     327: (wKb4. Qh7. Pc5: bKe6. Qc6) Btm ( 40)
234: (wKa8. Qh6. Pc6: bKf5. Qc7) Btm ( 35)     333: (wKa3. Qf8. Pc5: bKg6. Qe4) Btm ( 40)
250: (wKg6. Qg5. Pc6: bKh1. Qg3) Btm ( 35)     338: (wKc3. Qe3. Pc5: bKa3. Qd5) Btm ( 40)
252: (wKh6. Qe4. Pc6: bKb3. Qg3) Btm ( 35)     343: (wKe3. Qf5. Pc5: bKg7. Qd1) Btm ( 40)
258: (wKa4. Qe8. Pc6: bKf6. Qb6) Btm ( 35)     354: (wKe2. Qe7. Pc5: bKg8. Qa3) Btm ( 40)
275: (wKa2. Qc5. Pc6: bKe6. Qh8) Btm ( 35)     355: (wKf2. Qe3. Pc5: bKh5. Qb8) Btm ( 40)
329: (wKb4. Qh7. Pc5: bKe6. Qf1) Btm ( 35)     389: (wKc3. Qc7. Pc4: bKe6. Qb1) Btm ( 40)
334: (wKb3. Qf5. Pc5: bKg7. Qd4) Btm ( 35)     549: (wKe8. Qf7. Pd5: bKh8. Qg6) Btm ( 40)
336: (wKc3. Qe7. Pc5: bKf5. Qa4) Btm ( 35)     552: (wKg8. Qc4. Pd5: bKe3. Qf5) Btm ( 40)
529: (wKf4. Qb6. Pd6: bKh5. Qd5) Btm ( 35)     565: (wKf4. Qc5. Pd5: bKd3. Qh5) Btm ( 40)
555: (wKc6. Qe6. Pd5: bKd4. Qf3) Btm ( 35)     579: (wKd8. Qd5. Pd4: bKb4. Qa7) Btm ( 40)
582: (wKa7. Qd7. Pd4: bKa5. Qf8) Btm ( 35)      79: (wKd8. Qa6. Pb6: bKb2. Qc6) Btm ( 41)
 26: (wKe6. Qb5. Pa6: bKa1. Qa7) Btm ( 36)      80: (wKe8. Qe3. Pb6: bKf5. Qb7) Btm ( 41)
 99: (wKa3. Qe3. Pb6: bKf8. Qc4) Btm ( 36)      82: (wKa7. Qa6. Pb6: bKc6. Qd4) Btm ( 41)
244: (wKh7. Qe4. Pc6: bKb3. Qg1) Btm ( 36)      98: (wKh4. Qc6. Pb6: bKf2. Qf5) Btm ( 41)
245: (wKh7. Qe4. Pc6: bKc3. Qg3) Btm ( 36)     129: (wKh1. Qg4. Pb6: bKe3. Qa6) Btm ( 41)
289: (wKg2. Qb5. Pc6: bKa3. Qc1) Btm ( 36)     132: (wKd8. Qd7. Pb5: bKe5. Qc5) Btm ( 41)
293: (wKb1. Qe6. Pc6: bKf8. Qd2) Btm ( 36)     139: (wKa6. Qa5. Pb5: bKc5. Qd3) Btm ( 41)
310: (wKa8. Qe8. Pc5: bKf5. Qc7) Btm ( 36)     143: (wKb6. Qe3. Pb5: bKa2. Qd5) Btm ( 41)
313: (wKg8. Qf7. Pc5: bKa1. Qb3) Btm ( 36)     163: (wKd3. Qe5. Pb5: bKf7. Qc1) Btm ( 41)
318: (wKb6. Qd6. Pc5: bKc4. Qe3) Btm ( 36)     308: (wKh1. Qe6. Pc6: bKd2. Qg3) Btm ( 41)
319: (wKd6. Qc6. Pc5: bKd4. Qc4) Btm ( 36)     335: (wKb3. Qc4. Pc5: bKe5. Qa5) Btm ( 41)
328: (wKb4. Qh7. Pc5: bKe6. Qg3) Btm ( 36)     349: (wKa2. Qf5. Pc5: bKg8. Qe3) Btm ( 41)
340: (wKd3. Qe7. Pc5: bKf5. Qb4) Btm ( 36)      24: (wKe7. Qf4. Pa6: bKd3. Qa5) Btm ( 42)
509: (wKd7. Qe6. Pd6: bKc5. Qd2) Btm ( 36)     102: (wKa3. Qc7. Pb6: bKd1. Qb5) Btm ( 42)
538: (wKg2. Qh2. Pd6: bKa2. Qf5) Btm ( 36)     135: (wKe7. Qd7. Pb5: bKe5. Qd5) Btm ( 42)
542: (wKf1. Qa3. Pd6: bKh2. Qd2) Btm ( 36)     164: (wKd3. Qe3. Pb5: bKf7. Qc7) Btm ( 42)
586: (wKd7. Qf6. Pd4: bKb5. Qg1) Btm ( 36)     272: (wKe3. Qe4. Pc6: bKf8. Qd6) Btm ( 42)
 91: (wKh6. Qg6. Pb6: bKf4. Qe7) Btm ( 37)     286: (wKf2. Qa4. Pc6: bKh3. Qd3) Btm ( 42)
 97: (wKh4. Qf6. Pb6: bKe4. Qd7) Btm ( 37)     312: (wKg8. Qb5. Pc5: bKa3. Qe7) Btm ( 42)
142: (wKb6. Qc3. Pb5: bKa2. Qe4) Btm ( 37)     331: (wKd4. Qf1. Pc5: bKg6. Qc6) Btm ( 42)
150: (wKa5. Qc3. Pb5: bKa2. Qd5) Btm ( 37)     382: (wKb4. Qa7. Pc4: bKe6. Qc6) Btm ( 42)
240: (wKh8. Qe4. Pc6: bKb3. Qg3) Btm ( 37)     384: (wKe4. Qe6. Pc4: bKf8. Qc5) Btm ( 42)
301: (wKf1. Qf6. Pc6: bKe8. Qc7) Btm ( 37)     385: (wKb3. Qd6. Pc4: bKe8. Qa5) Btm ( 42)
366: (wKa7. Qf4. Pc4: bKg6. Qc6) Btm ( 37)     451: (wKc7. Qb6. Pc2: bKe7. Qd5) Btm ( 42)
378: (wKb5. Qd4. Pc4: bKe8. Qe6) Btm ( 37)     551: (wKg8. Qc5. Pd5: bKa4. Qf5) Btm ( 42)
526: (wKb4. Qe7. Pd6: bKg8. Qf5) Btm ( 37)     553: (wKa6. Qe5. Pd5: bKd3. Qc5) Btm ( 42)
527: (wKc4. Qf6. Pd6: bKg8. Qa5) Btm ( 37)     574: (wKf1. Qb3. Pd5: bKh2. Qd2) Btm ( 42)
548: (wKd8. Qg5. Pd5: bKf7. Qe4) Btm ( 37)      84: (wKg7. Qa7. Pb6: bKg5. Qg2) Btm ( 43)
557: (wKe6. Qc5. Pd5: bKe4. Qb3) Btm ( 37)     106: (wKa2. Qe3. Pb6: bKf8. Qb5) Btm ( 43)
572: (wKg2. Qd6. Pd5: bKb3. Qb7) Btm ( 37)     122: (wKe1. Qd6. Pb6: bKe8. Qb5) Btm ( 43)
 50: (wKc6. Qc5. Pa5: bKe4. Qd3) Btm ( 38)     146: (wKh6. Qg6. Pb5: bKf3. Qe7) Btm ( 43)
 96: (wKa4. Qc2. Pb6: bKg3. Qe1) Btm ( 38)     149: (wKa5. Qc6. Pb5: bKb3. Qf5) Btm ( 43)
151: (wKa5. Qe3. Pb5: bKb2. Qd5) Btm ( 38)     155: (wKc4. Qd5. Pb5: bKe7. Qd6) Btm ( 43)
322: (wKb5. Qa5. Pc5: bKh5. Qd5) Btm ( 38)     285: (wKe2. Qe4. Pc6: bKc3. Qd6) Btm ( 43)
341: (wKd3. Qc6. Pc5: bKf5. Qb4) Btm ( 38)     287: (wKg2. Qe6. Pc6: bKf8. Qf4) Btm ( 43)
342: (wKe3. Qe7. Pc5: bKg8. Qc4) Btm ( 38)     291: (wKa1. Qf3. Pc6: bKg8. Qd2) Btm ( 43)
356: (wKf2. Qc3. Pc5: bKa2. Qb5) Btm ( 38)     300: (wKe1. Qa4. Pc6: bKg3. Qd3) Btm ( 43)
379: (wKc5. Qb4. Pc4: bKe7. Qa6) Btm ( 38)     321: (wKa5. Qb8. Pc5: bKc3. Qe4) Btm ( 43)
381: (wKb4. Qc8. Pc4: bKe7. Qd3) Btm ( 38)     350: (wKa2. Qd1. Pc5: bKe3. Qc6) Btm ( 43)
  1: (wKa8. Qb7. Pa7: bKh8. Qc3) Btm ( 39)     388: (wKc3. Qd7. Pc4: bKf8. Qb6) Btm ( 43)
 86: (wKa6. Qg1. Pb6: bKe2. Qf6) Btm ( 39)     107: (wKa2. Qe3. Pb6: bKf6. Qb5) Btm ( 44)
101: (wKa3. Qc7. Pb6: bKb1. Qb5) Btm ( 39)     128: (wKg1. Qe2. Pb6: bKf4. Qd7) Btm ( 44)
115: (wKh2. Qg4. Pb6: bKe3. Qb5) Btm ( 39)     131: (wKh1. Qf6. Pb6: bKe1. Qg8) Btm ( 44)
255: (wKh5. Qe6. Pc6: bKf8. Qg3) Btm ( 39)     144: (wKb6. Qe3. Pb5: bKb2. Qc4) Btm ( 44)
283: (wKd2. Qg4. Pc6: bKf6. Qf1) Btm ( 39)     167: (wKc2. Qd7. Pb5: bKf8. Qa3) Btm ( 44)
294: (wKb1. Qf3. Pc6: bKg7. Qd2) Btm ( 39)     171: (wKh1. Qc6. Pb5: bKh8. Qf2) Btm ( 44)
298: (wKe1. Qf3. Pc6: bKg6. Qd6) Btm ( 39)     295: (wKc1. Qc3. Pc6: bKg6. Qd5) Btm ( 44)
303: (wKf1. Qg6. Pc6: bKf4. Qe7) Btm ( 39)     299: (wKe1. Qe4. Pc6: bKc3. Qc5) Btm ( 44)
317: (wKb6. Qc6. Pc5: bKb4. Qc4) Btm ( 39)     377: (wKa5. Qf4. Pc4: bKg6. Qc6) Btm ( 44)
330: (wKb4. Qb5. Pc5: bKd5. Qc8) Btm ( 39)     395: (wKb2. Qf5. Pc4: bKg8. Qe3) Btm ( 44)
337: (wKc3. Qb6. Pc5: bKf5. Qa4) Btm ( 39)     415: (wKb4. Qd7. Pc3: bKf8. Qe1) Btm ( 44)
352: (wKd2. Qe7. Pc5: bKg8. Qb3) Btm ( 39)     580: (wKd8. Qd5. Pd4: bKf4. Qg7) Btm ( 44)
362: (wKc8. Qe4. Pc4: bKf6. Qd6) Btm ( 39)      23: (wKe7. Qh6. Pa6: bKg4. Qd3) Btm ( 45)
545: (wKa8. Qe4. Pd5: bKc3. Qb5) Btm ( 39)      33: (wKf4. Qc8. Pa6: bKd4. Qa4) Btm ( 45)
570: (wKc2. Qh5. Pd5: bKg3. Qf6) Btm ( 39)     100: (wKa3. Qe3. Pb6: bKf5. Qb5) Btm ( 45)
 22: (wKe7. Qd3. Pa6: bKf4. Qa4) Btm ( 40)     105: (wKh3. Qg4. Pb6: bKe3. Qb1) Btm ( 45)
 78: (wKd8. Qe3. Pb6: bKg4. Qb7) Btm ( 40)     117: (wKa1. Qd6. Pb6: bKe8. Qc2) Btm ( 45)
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119: (wKa1. Qe3. Pb6: bKf6. Qb4) Btm (45)		363: (wKe8. Qd4. Pc4: bKg6. Qc7) Btm (51)
147: (wKa5. Qf3. Pb5: bKd6. Qc4) Btm (45)		400: (wKc2. Qe2. Pc4: bKa2. Qf6) Btm (51)
173: (wKc8. Qc5. Pb4: bKa1. Qc2) Btm (45)		405: (wKa8. Qf6. Pc3: bKh7. Qc7) Btm (51)
339: (wKd3. Qf2. Pc5: bKg8. Qb4) Btm (45)		421: (wKb3. Qc7. Pc3: bKe6. Qd2) Btm (51)
345: (wKg3. Qd6. Pc5: bKh8. Qf5) Btm (45)		596: (wKf4. Qc4. Pd4: bKa3. Qe1) Btm (51)
358: (wKh2. Qd4. Pc5: bKe1. Qf5) Btm (45)		126: (wKg1. Qg6. Pb6: bKf8. Qb7) Btm (52)
407: (wKc7. Qd7. Pc3: bKh8. Qf7) Btm (45)		134: (wKb7. Qg5. Pb5: bKd8. Qe1) Btm (52)
528: (wKf4. Qd7. Pd6: bKh6. Qd5) Btm (45)		165: (wKg3. Qc5. Pb5: bKe2. Qa5) Btm (52)
559: (wKb5. Qf7. Pd5: bKg5. Qd6) Btm (45)		306: (wKg1. Qf3. Pc6: bKb2. Qe5) Btm (52)
569: (wKh3. Qf7. Pd5: bKg1. Qg5) Btm (45)		370: (wKf7. Qf6. Pc4: bKh1. Qf2) Btm (52)
17: (wKh8. Qd6. Pa6: bKe4. Qf7) Btm (46)		392: (wKf3. Qb5. Pc4: bKh4. Qd4) Btm (52)
113: (wKg2. Qd4. Pb6: bKf5. Qb3) Btm (46)		399: (wKc2. Qg1. Pc4: bKh6. Qd6) Btm (52)
125: (wKf1. Qe6. Pb6: bKd3. Qb2) Btm (46)		414: (wKe5. Qb4. Pc3: bKa1. Qb3) Btm (52)
130: (wKh1. Qg1. Pb6: bKa2. Qb5) Btm (46)		595: (wKe4. Qc5. Pd4: bKb3. Qa4) Btm (52)
297: (wKe1. Qf3. Pc6: bKg8. Qd6) Btm (46)		28: (wKd5. Qe6. Pa6: bKb3. Qc7) Btm (53)
323: (wKg5. Qb6. Pc5: bKa4. Qf7) Btm (46)		136: (wKe7. Qe2. Pb5: bKb1. Qd5) Btm (53)
346: (wKh3. Qd6. Pc5: bKh8. Qe4) Btm (46)		348: (wKh3. Qf8. Pc5: bKg1. Qg5) Btm (53)
357: (wKg2. Qd6. Pc5: bKh8. Qf7) Btm (46)		361: (wKg1. Qf2. Pc5: bKa1. Qc3) Btm (53)
503: (wKf8. Qf7. Pd6: bKh8. Qf5) Btm (46)		364: (wKg8. Qb5. Pc4: bKa2. Qe7) Btm (53)
519: (wKb5. Qe3. Pd6: bKf5. Qa8) Btm (46)		371: (wKg7. Qb5. Pc4: bKa3. Qf1) Btm (53)
37: (wKb3. Qd3. Pa6: bKe8. Qa5) Btm (47)		386: (wKb3. Qb6. Pc4: bKe5. Qd2) Btm (53)
111: (wKe2. Qe3. Pb6: bKf8. Qd6) Btm (47)		391: (wKd3. Qc6. Pc4: bKf5. Qa5) Btm (53)
114: (wKh2. Qg3. Pb6: bKf8. Qd7) Btm (47)		394: (wKa2. Qe4. Pc4: bKg3. Qc3) Btm (53)
123: (wKe1. Qc5. Pb6: bKf4. Qd3) Btm (47)		402: (wKb1. Qe4. Pc4: bKg3. Qf2) Btm (53)
137: (wKg7. Qd7. Pb5: bKa1. Qa4) Btm (47)		422: (wKb3. Qc4. Pc3: bKf6. Qa5) Btm (53)
145: (wKf6. Qf5. Pb5: bKa1. Qc2) Btm (47)		124: (wKe1. Qe3. Pb6: bKg4. Qd5) Btm (54)
166: (wKb2. Qe2. Pb5: bKf8. Qg3) Btm (47)		152: (wKc5. Qg3. Pb5: bKh5. Qa5) Btm (54)
170: (wKh2. Qd5. Pb5: bKg7. Qa4) Btm (47)		186: (wKb3. Qc7. Pb4: bKe8. Qa6) Btm (54)
284: (wKe2. Qf3. Pc6: bKg7. Qd6) Btm (47)		188: (wKb3. Qd5. Pb4: bKe8. Qa6) Btm (54)
307: (wKh1. Qf3. Pc6: bKg6. Qd6) Btm (47)		374: (wKg6. Qe6. Pc4: bKf4. Qf8) Btm (54)
325: (wKg5. Qe3. Pc5: bKb2. Qf1) Btm (47)		375: (wKg6. Qb5. Pc4: bKa2. Qf1) Btm (54)
359: (wKa1. Qb4. Pc5: bKe3. Qc2) Btm (47)		387: (wKb3. Qh6. Pc4: bKe5. Qc5) Btm (54)
360: (wKg1. Qd6. Pc5: bKh8. Qf5) Btm (47)		393: (wKf3. Qb4. Pc4: bKh3. Qd4) Btm (54)
416: (wKd4. Qd8. Pc3: bKf7. Qe1) Btm (47)		396: (wKb2. Qc5. Pc4: bKg4. Qd3) Btm (54)
81: (wKf8. Qa6. Pb6: bKh6. Qe6) Btm (48)		408: (wKd7. Qd4. Pc3: bKe2. Qa1) Btm (54)
112: (wKf2. Qe3. Pb6: bKf7. Qd6) Btm (48)		525: (wKb4. Qc7. Pd6: bKf8. Qf5) Btm (54)
138: (wKa6. Qa2. Pb5: bKd6. Qd3) Btm (48)		376: (wKg6. Qb4. Pc4: bKa2. Qf4) Btm (55)
159: (wKa3. Qe5. Pb5: bKf7. Qc4) Btm (48)		390: (wKc3. Qb5. Pc4: bKf4. Qd6) Btm (55)
162: (wKc3. Qe8. Pb5: bKf6. Qa4) Btm (48)		397: (wKb2. Qb5. Pc4: bKh4. Qd3) Btm (55)
187: (wKb3. Qd6. Pb4: bKe8. Qb5) Btm (48)		401: (wKg2. Qd4. Pc4: bKe2. Qb8) Btm (55)
191: (wKb2. Qd7. Pb4: bKf8. Qe3) Btm (48)		575: (wKg1. Qg5. Pd5: bKa1. Qc3) Btm (55)
273: (wKe3. Qf3. Pc6: bKg8. Qd6) Btm (48)		625: (wKd8. Qd5. Pd2: bKa3. Qa7) Btm (55)
274: (wKe3. Qf3. Pc6: bKg6. Qd6) Btm (48)		27: (wKb5. Qc6. Pa6: bKd1. Qd4) Btm (56)
302: (wKf1. Qe6. Pc6: bKf8. Qc7) Btm (48)		369: (wKc7. Qc1. Pc4: bKf5. Qd3) Btm (56)
314: (wKf7. Qe3. Pc5: bKb2. Qc8) Btm (48)		372: (wKh7. Qe4. Pc4: bKg3. Qg5) Btm (56)
320: (wKd6. Qb5. Pc5: bKd4. Qa3) Btm (48)		380: (wKc5. Qc3. Pc4: bKd1. Qb7) Btm (56)
423: (wKb3. Qb6. Pc3: bKd5. Qg3) Btm (48)		410: (wKf7. Qd4. Pc3: bKe2. Qa1) Btm (56)
530: (wKf4. Qa6. Pd6: bKh4. Qd5) Btm (48)		419: (wKa3. Qe5. Pc3: bKf7. Qc4) Btm (56)
634: (wKc3. Qd3. Pd2: bKa3. Qe6) Btm (48)		424: (wKb3. Qa6. Pc3: bKe5. Qc5) Btm (56)
39: (wKh3. Qg3. Pa6: bKf6. Qd2) Btm (49)		504: (wKf8. Qd5. Pd6: bKf6. Qg6) Btm (56)
118: (wKa1. Qe3. Pb6: bKf7. Qb5) Btm (49)		104: (wKh3. Qb3. Pb6: bKf6. Qe5) Btm (57)
127: (wKg1. Qe3. Pb6: bKf7. Qd5) Btm (49)		154: (wKa4. Qd4. Pb5: bKh5. Qe8) Btm (57)
161: (wKc3. Qe2. Pb5: bKf8. Qa4) Btm (49)		169: (wKe2. Qb3. Pb5: bKh4. Qb6) Btm (57)
185: (wKa3. Qd6. Pb4: bKf7. Qb5) Btm (49)		175: (wKb7. Qg4. Pb4: bKh6. Qb2) Btm (57)
311: (wKg8. Qb6. Pc5: bKa4. Qe7) Btm (49)		404: (wKf1. Qb3. Pc4: bKh2. Qd2) Btm (57)
315: (wKg7. Qe3. Pc5: bKa2. Qc8) Btm (49)		458: (wKb3. Qd7. Pc2: bKf6. Qc5) Btm (57)
344: (wKf3. Qf2. Pc5: bKd1. Qc4) Btm (49)		590: (wKc5. Qf6. Pd4: bKc3. Qe3) Btm (57)
398: (wKc2. Qg5. Pc4: bKh8. Qa3) Btm (49)		12: (wKe8. Qb5. Pa6: bKc3. Qc7) Btm (58)
514: (wKb6. Qf8. Pd6: bKg6. Qd7) Btm (49)		121: (wKa1. Qc2. Pb6: bKd4. Qd6) Btm (58)
576: (wKg1. Qg5. Pd5: bKb1. Qe4) Btm (49)		190: (wKf3. Qe7. Pb4: bKg8. Qd4) Btm (58)
19: (wKa7. Qe5. Pa6: bKg6. Qb4) Btm (50)		426: (wKd3. Qf5. Pc3: bKg7. Qa3) Btm (58)
158: (wKg4. Qf5. Pb5: bKg8. Qb7) Btm (50)		434: (wKc2. Qc4. Pc3: bKg7. Qa5) Btm (58)
192: (wKb2. Qd6. Pb4: bKf7. Qc4) Btm (50)		452: (wKf7. Qe4. Pc2: bKg5. Qc3) Btm (58)
324: (wKg5. Qb5. Pc5: bKa3. Qf7) Btm (50)		517: (wKa5. Qe6. Pd6: bKg5. Qc6) Btm (58)
347: (wKh3. Qc2. Pc5: bKe1. Qd4) Btm (50)		628: (wKf7. Qe6. Pd2: bKh7. Qd3) Btm (58)
412: (wKe6. Qd4. Pc3: bKe2. Qb2) Btm (50)		11: (wKd8. Qd6. Pa6: bKh5. Qe3) Btm (59)
539: (wKg2. Qh2. Pd6: bKc2. Qf5) Btm (50)		14: (wKf8. Qb5. Pa6: bKd4. Qc7) Btm (59)
629: (wKf6. Qe3. Pd2: bKa2. Qc1) Btm (50)		181: (wKb5. Qc5. Pb4: bKe6. Qh8) Btm (59)
18: (wKa7. Qd5. Pa6: bKf6. Qb4) Btm (51)		182: (wKa4. Qc5. Pb4: bKd8. Qb8) Btm (59)
120: (wKa1. Qe3. Pb6: bKf5. Qb5) Btm (51)		413: (wKe5. Qa5. Pc3: bKg7. Qc8) Btm (59)
172: (wKh1. Qc6. Pb5: bKa1. Qg3) Btm (51)		428: (wKb2. Qg5. Pc3: bKh7. Qc4) Btm (59)
174: (wKa7. Qb7. Pb4: bKd6. Qb2) Btm (51)		462: (wKb2. Qc7. Pc2: bKd4. Qg2) Btm (59)
305: (wKf1. Qf3. Pc6: bKb2. Qd6) Btm (51)		520: (wKc5. Qb5. Pd6: bKf7. Qe6) Btm (59)
351: (wKc2. Qd4. Pc5: bKa3. Qh1) Btm (51)		550: (wKg8. Qd8. Pd5: bKg6. Qa6) Btm (59)

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592: (wKd5. Qc4. Pd4: bKf7. Qb6) Btm ( 59)        476: (wKe1. Qf2. Pc2: bKh1. Qg3) Btm ( 67)
620: (wKc3. Qc6. Pd3: bKe5. Qh3) Btm ( 59)        603: (wKf2. Qd3. Pd4: bKb2. Qd5) Btm ( 67)
 16: (wKg8. Qb5. Pa6: bKc3. Qc7) Btm ( 60)        604: (wKc1. Qf4. Pd4: bKa1. Qd3) Btm ( 67)
148: (wKa5. Qd4. Pb5: bKh5. Qf5) Btm ( 60)        608: (wKg1. Qf2. Pd4: bKa1. Qb3) Btm ( 67)
157: (wKe4. Qc4. Pb5: bKh4. Qb6) Btm ( 60)        616: (wKd5. Qa4. Pd3: bKb1. Qb6) Btm ( 67)
205: (wKe4. Qd3. Pb2: bKg6. Qc5) Btm ( 60)        617: (wKh5. Qf5. Pd3: bKg2. Qc2) Btm ( 67)
469: (wKb1. Qe4. Pc2: bKd2. Qc3) Btm ( 60)         40: (wKa2. Qd6. Pa6: bKe4. Qb5) Btm ( 68)
501: (wKb8. Qe7. Pd6: bKf5. Qd5) Btm ( 60)         47: (wKa8. Qf5. Pa5: bKh6. Qc7) Btm ( 68)
606: (wKe1. Qf2. Pd4: bKh1. Qg3) Btm ( 60)         48: (wKb8. Qe5. Pa5: bKg6. Qc6) Btm ( 68)
193: (wKb2. Qc5. Pb4: bKd3. Qc4) Btm ( 61)         52: (wKb3. Qd2. Pa5: bKg8. Qa8) Btm ( 68)
418: (wKf4. Qc7. Pc3: bKg6. Qd3) Btm ( 61)        183: (wKd4. Qc3. Pb4: bKf6. Qe2) Btm ( 68)
433: (wKc2. Qe7. Pc3: bKg8. Qb5) Btm ( 61)        199: (wKd3. Qd5. Pb3: bKh6. Qb4) Btm ( 68)
438: (wKd2. Qg5. Pc3: bKh7. Qc4) Btm ( 61)        200: (wKd2. Qf6. Pb3: bKh7. Qc5) Btm ( 68)
450: (wKb7. Qc3. Pc2: bKf4. Qd6) Btm ( 61)        368: (wKb7. Qc3. Pc4: bKd1. Qc5) Btm ( 68)
558: (wKe6. Qd2. Pd5: bKe4. Qb3) Btm ( 61)        383: (wKb4. Qf7. Pc4: bKc2. Qe4) Btm ( 68)
563: (wKc4. Qf8. Pd5: bKg6. Qe3) Btm ( 61)        618: (wKa4. Qd6. Pd3: bKf5. Qb7) Btm ( 68)
601: (wKa2. Qf4. Pd4: bKg2. Qb4) Btm ( 61)         49: (wKa7. Qe5. Pa5: bKf7. Qc6) Btm ( 69)
607: (wKf1. Qf2. Pd4: bKh1. Qf4) Btm ( 61)         53: (wKe7. Qe3. Pa4: bKh7. Qf5) Btm ( 69)
624: (wKd1. Qe4. Pd3: bKf2. Qe3) Btm ( 61)        373: (wKa6. Qc3. Pc4: bKe2. Qc5) Btm ( 69)
 13: (wKf8. Qd6. Pa6: bKh5. Qe3) Btm ( 62)        464: (wKb1. Qe5. Pc2: bKg4. Qa3) Btm ( 69)
 51: (wKd4. Qe5. Pa5: bKf7. Qa6) Btm ( 62)        597: (wKc3. Qb5. Pd4: bKg4. Qf6) Btm ( 69)
177: (wKd7. Qg4. Pb4: bKh6. Qb2) Btm ( 62)        600: (wKh3. Qg3. Pd4: bKh1. Qe3) Btm ( 69)
178: (wKa6. Qb5. Pb4: bKd6. Qc3) Btm ( 62)        609: (wKb8. Qd4. Pd3: bKh3. Qc6) Btm ( 69)
180: (wKa5. Qb5. Pb4: bKe6. Qh8) Btm ( 62)        622: (wKc2. Qd4. Pd3: bKf1. Qf5) Btm ( 69)
184: (wKa3. Qc7. Pb4: bKe8. Qb5) Btm ( 62)         46: (wKf1. Qc4. Pa6: bKg5. Qe3) Btm ( 70)
427: (wKe3. Qf4. Pc3: bKg6. Qd7) Btm ( 62)        198: (wKa3. Qd6. Pb3: bKg7. Qb5) Btm ( 70)
429: (wKb2. Qd5. Pc3: bKe3. Qa4) Btm ( 62)        447: (wKf1. Qf2. Pc3: bKh1. Qf4) Btm ( 70)
435: (wKc2. Qf7. Pc3: bKg5. Qd6) Btm ( 62)        454: (wKf6. Qc4. Pc2: bKf2. Qe3) Btm ( 70)
449: (wKa7. Qc3. Pc2: bKg4. Qd6) Btm ( 62)        471: (wKb1. Qe6. Pc2: bKf2. Qc3) Btm ( 70)
463: (wKb2. Qb5. Pc2: bKd4. Qh2) Btm ( 62)        598: (wKc3. Qc4. Pd4: bKg3. Qf6) Btm ( 70)
465: (wKb1. Qd4. Pc2: bKf3. Qa3) Btm ( 62)         41: (wKg2. Qc4. Pa6: bKh5. Qe3) Btm ( 71)
578: (wKc8. Qa4. Pd4: bKh8. Qe4) Btm ( 62)         54: (wKa6. Qe8. Pa4: bKg7. Qa1) Btm ( 71)
581: (wKf8. Qb6. Pd4: bKh7. Qd7) Btm ( 62)        140: (wKa6. Qa5. Pb5: bKc5. Qb2) Btm ( 71)
583: (wKb7. Qe5. Pd4: bKf8. Qa2) Btm ( 62)        197: (wKf4. Qb6. Pb3: bKf8. Qe8) Btm ( 71)
593: (wKb4. Qf6. Pd4: bKg4. Qd5) Btm ( 62)        472: (wKb1. Qg4. Pc2: bKe1. Qc3) Btm ( 71)
599: (wKf3. Qc4. Pd4: bKd2. Qh4) Btm ( 62)        610: (wKf8. Qe7. Pd3: bKh8. Qd4) Btm ( 71)
602: (wKb2. Qc3. Pd4: bKe2. Qe6) Btm ( 62)        615: (wKd5. Qc4. Pd3: bKf7. Qb8) Btm ( 71)
 95: (wKe5. Qd4. Pb6: bKf1. Qb3) Btm ( 63)        455: (wKg6. Qg5. Pc2: bKh1. Qg3) Btm ( 72)
430: (wKb2. Qf5. Pc3: bKd2. Qa4) Btm ( 63)        466: (wKb1. Qe1. Pc2: bKf3. Qa3) Btm ( 72)
442: (wKc1. Qg2. Pc3: bKh7. Qd7) Btm ( 63)        640: (wKe1. Qf3. Pd2: bKh2. Qb4) Btm ( 72)
453: (wKb6. Qd2. Pc2: bKf3. Qc4) Btm ( 63)         55: (wKe6. Qc4. Pa4: bKg7. Qd1) Btm ( 73)
457: (wKa3. Qf5. Pc2: bKg7. Qc4) Btm ( 63)         87: (wKa6. Qg2. Pb6: bKe1. Qf6) Btm ( 73)
461: (wKa2. Qe4. Pc2: bKf2. Qc3) Btm ( 63)        627: (wKb7. Qd3. Pd2: bKh2. Qc5) Btm ( 73)
564: (wKe4. Qd8. Pd5: bKg6. Qg7) Btm ( 63)        196: (wKa4. Qe5. Pb3: bKf7. Qd1) Btm ( 74)
584: (wKb7. Qe4. Pd4: bKf8. Qa1) Btm ( 63)        403: (wKd1. Qa4. Pc4: bKf1. Qc3) Btm ( 74)
587: (wKb6. Qe5. Pd4: bKf7. Qa2) Btm ( 63)        406: (wKg8. Qd2. Pc3: bKg1. Qe7) Btm ( 74)
194: (wKa7. Qb6. Pb3: bKd7. Qg8) Btm ( 64)        456: (wKh6. Qc5. Pc2: bKh1. Qe4) Btm ( 74)
425: (wKd3. Qf6. Pc3: bKg8. Qa2) Btm ( 64)        636: (wKe3. Qf4. Pd2: bKh3. Qb5) Btm ( 74)
443: (wKc1. Qd5. Pc3: bKg4. Qf2) Btm ( 64)        206: (wKa3. Qe5. Pb2: bKf8. Qd2) Btm ( 75)
467: (wKb1. Qe4. Pc2: bKg3. Qc3) Btm ( 64)        440: (wKf2. Qb4. Pc3: bKh3. Qd3) Btm ( 75)
473: (wKc1. Qd5. Pc2: bKf4. Qb6) Btm ( 64)        474: (wKc1. Qf5. Pc2: bKg3. Qd4) Btm ( 75)
560: (wKc5. Qb8. Pd5: bKf7. Qd7) Btm ( 64)        591: (wKd5. Qc7. Pd4: bKg8. Qa4) Btm ( 75)
561: (wKc5. Qe2. Pd5: bKf7. Qf6) Btm ( 64)        612: (wKg6. Qe4. Pd3: bKg3. Qc2) Btm ( 76)
179: (wKa5. Qc4. Pb4: bKd8. Qd6) Btm ( 65)        621: (wKe3. Qa6. Pd3: bKd1. Qb3) Btm ( 76)
195: (wKc5. Qb4. Pb3: bKe7. Qa6) Btm ( 65)        639: (wKc2. Qc6. Pd2: bKh2. Qd4) Btm ( 76)
441: (wKb1. Qd5. Pc3: bKh4. Qf2) Btm ( 65)        141: (wKb6. Qa4. Pb5: bKd5. Qb1) Btm ( 77)
470: (wKb1. Qb4. Pc2: bKe2. Qd8) Btm ( 65)        613: (wKg6. Qd5. Pd3: bKf2. Qc3) Btm ( 77)
566: (wKg4. Qg5. Pd5: bKh8. Qf7) Btm ( 65)        623: (wKd2. Qh4. Pd3: bKg2. Qf8) Btm ( 77)
 42: (wKb1. Qb7. Pa6: bKg8. Qc5) Btm ( 66)        611: (wKf7. Qb5. Pd3: bKh6. Qd6) Btm ( 78)
 43: (wKc1. Qc3. Pa6: bKh6. Qe4) Btm ( 66)        204: (wKe4. Qb5. Pb2: bKf7. Qc7) Btm ( 79)
432: (wKb2. Qg2. Pc3: bKe1. Qc4) Btm ( 66)        626: (wKd8. Qd5. Pd2: bKg3. Qg7) Btm ( 79)
468: (wKb1. Qc4. Pc2: bKd2. Qf5) Btm ( 66)        631: (wKb4. Qd6. Pd2: bKe4. Qe8) Btm ( 79)
475: (wKc1. Qe4. Pc2: bKf2. Qc3) Btm ( 66)        176: (wKc7. Qg4. Pb4: bKf6. Qf1) Btm ( 80)
546: (wKb8. Qb3. Pd5: bKe2. Qc5) Btm ( 66)        448: (wKd8. Qf5. Pc2: bKg2. Qc4) Btm ( 81)
594: (wKc4. Qd6. Pd4: bKg7. Qa5) Btm ( 66)        409: (wKe7. Qe5. Pc3: bKf3. Qc4) Btm ( 82)
605: (wKe1. Qb4. Pd4: bKg1. Qd3) Btm ( 66)        207: (wKd3. Qe5. Pb2: bKf7. Qc1) Btm ( 84)
 25: (wKe6. Qc4. Pa6: bKe3. Qa3) Btm ( 67)        436: (wKc2. Qf6. Pc3: bKg4. Qd5) Btm ( 86)
 35: (wKa3. Qd6. Pa6: bKf5. Qb5) Btm ( 67)        444: (wKc1. Qf6. Pc3: bKg3. Qd5) Btm ( 86)
 92: (wKa5. Qe5. Pb6: bKf3. Qb3) Btm ( 67)        633: (wKd4. Qg5. Pd2: bKh3. Qc8) Btm ( 87)
 93: (wKa5. Qg6. Pb6: bKf1. Qb3) Btm ( 67)        437: (wKc2. Qa3. Pc3: bKf2. Qd5) Btm ( 89)
202: (wKa6. Qb6. Pb2: bKd7. Qh8) Btm ( 67)        632: (wKc4. Qg5. Pd2: bKf1. Qf2) Btm ( 89)
367: (wKb7. Qb3. Pc4: bKe2. Qc5) Btm ( 67)        619: (wKd4. Qf3. Pd3: bKh2. Qc8) Btm ( 90)
431: (wKb2. Qg2. Pc3: bKe1. Qe5) Btm ( 67)        417: (wKc4. Qg4. Pc3: bKe1. Qe3) Btm ( 91)
439: (wKd2. Qf7. Pc3: bKg5. Qa6) Btm ( 67)        ==========================================
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The testing of chess endgame studies by computer
by John Beasley
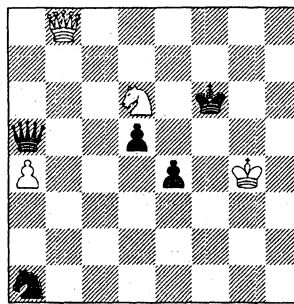(an article written for EG, October 1995)

"Making the best use of computers for testing studies is a subject we must cover in EG before long," wrote AJR in EG 116 (p 626). Let me make a contribution.

I use my computer for testing studies in three ways: (a) by looking up positions in the Thompson five-man endgame databases; (b) by using Richard Lang's chess program Genius to analyse them; (c) very occasionally, by writing ad hoc programs of my own. The use of the Thompson databases will be described in a later article which will report the experiences of others besides myself, and all I will say here is that for the positions within its scope (broadly, every five-man ending with at most one pawn) it is quite invaluable. I hold a copy in my capacity as the British Chess Problem Society Librarian, and a look-up service is offered to society members.

Genius does not offer the cast-iron certainty of the Thompson databases, but it also has proved extremely useful. I was initially chary of advertising my use of it, because it is not perfect and its author does not claim it to be perfect; studies explore positions to which the normal rules of evaluation do not apply, and if the crucial tactical event is over the computer's horizon then the computer will inevitably give the wrong answer. However, I will now place on record that since I became the study editor of the French quarterly diagrammes I have been using the 1993 version of Genius on a 486/25, a combination which is well short of the current state of the art, and that even this modest armoury suffices to demolish seventy per cent of the originals which I receive for publication.

What does Genius do well, and what less well? Its great strength is in spotting tactical oversights, whether outright lose-a-man blunders or three- or four-move combinations to win material. It also finds occasional remarkable busts based on quiet moves. The following well-known study by Troitzky (Novoye Vremya, 1897) shows a triple fork-plus-skewer:

B1

g4f6 4004.12 b8a5d6a1.a4d5e4 4/5+.

After 1.Qf8+, we have 1...Ke5 2.Sc4+ dxc4 3.Qf5+, or 1...Ke6 2.Sb7 Qe1 3.Sc5+ Ke5 4.Sd3+ exd3 5.Qe7+, or here 2...Qd2 3.Sc5+ Ke5 4.Qh8+ Kd6 5.Sxe4+ dxe4 6.Qd8+. However, after 1...Ke5, the computer pointed out the quiet move 2.Sb5, threatening immediate mate by 3.Qf5, and after 2...Ke6 3.Qf5+ Ke7 4.Qe5+ K-- 5.Qxa1, I think White wins. Wanting to quote this study in a Troitzky centenary article in diagrammes, I added a bP on a6, but Wallace Ellison has since suggested that moving bSa1 to g1 would serve just as well and I think he is right.
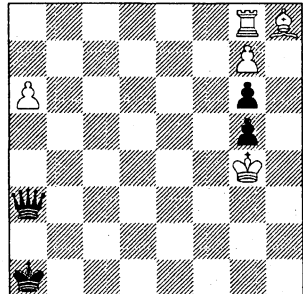
On the debit side, Genius is likely to misjudge pawn races, particularly if the moves of two pawns have to be co-ordinated to decoy a defender, and it can be hopelessly at sea in "fortress" draws. It has no specific mechanism for detecting these and the eventual repetition of position will be fifty moves into the future, so it judges them solely on material content and gets the wrong answer. This appears to apply even to basic endings such as bQ v wPa2, where it can work out the wins (given enough time) but does not appear to diagnose the draws. Occasionally, therefore, I write to a composer and say, "my computer wants to play so-and-so and I can see no good reply," but he points out such a reply and I have to write back and apologize. It happens about once a year.

I now come to the writing of an ad hoc program. The diagram shows a study which I composed for the 1994 World Chess Solving Championship. It is not a particularly good study, though there is a little sting in the tail which caught a few: 1.Rb8 Qa4+ 2.Kxg5 Qa5+ 3.Kxg6 Qxa6+ 4.Kg5 (wK must keep to the g-file) Qa5+ 5.Kg4 Qa4+ 6.Kg3 Qa3+ 7.Kg2 Qa2+ 8.Kg1 Qa7+ (the move which was sometimes overlooked) 9.Kh1, and Black has no more checks. The reason that it was used in the championship is very simple: it is a rule of the WCSC that the compositions set for solution

be computer-tested as far as possible, and this study (apparently unlike any previous WCSC study) appeared to be so testable. If White plays any other move in the solution above, Black can force perpetual check; if Black plays any other move, White can force a quick mate, and the same is true after 9.Kh1. Perpetual check and quick mates can be verified by computer.

B2

J.D.Beasley, 1994

g4a1 3110.22 a3g8h8.a6g7g5g6 5/4+.

The first stage in the analysis was to verify the perpetual checks. If Black checks with bQ, White will reply by moving wK or (after say, 1.Rf8 Qa4+ 2.Kg3 Qa3+) by interposing wR. There are in principle 64 squares available to each of bQ, wK, and wR (at this point in the program design, I ignored the fact that squares such as a1 were unavailable) but preliminary examination with board and men suggested that Black could in fact force the perpetual check without allowing wR to move away from the twelve squares a8-g8, f7-f5, g6-h6. Each of these twelve squares had to be considered with or without a wP on a6, because Black might capture this wP in the play, and there were also four special cases which would arise if White played 1.a7 or if wR were captured in the play (wPa7 and wRg8, wPa7 and no wR, wPa6 and no wR, and neither wP nor wR). This gave 64x64x28 possible configurations of bQ, wK, wR, and wP, and each of these configurations had to be considered with bPg5 and bPg6 both present, with bPg5 only, with bPg6 only, and with neither. Even so, there were only 64x64x112 positions to be examined, and this was easily done on a PC.

The first-stage program accordingly constructed each of these positions in turn, ignoring illegalities and impossibilities, and marked those in which Black was giving a "good" check (at this point, a check which White could not answer by capturing bQ). It then examined each of the marked positions, and considered White's possible

replies. If White could parry the check without allowing Black to move to another marked position, the check was no longer considered "good" and the mark was removed; otherwise, the mark was left. The effect was gradually to narrow down the "good" checks to those which would lead to a perpetual check, and the process was continued until a complete pass through the positions failed to remove any mark. The list of positions still marked was then written to a file for use by the second-stage program, and a set of boards showing the "good" checking squares for each configuration of wK, wR, wP, and bPg5/bPg6 was written to another file for verification by eye. Because I was considering only positions with wR on one of the twelve squares a8-g8, f7-f5, g6-h6, any move of wR to another square was treated as preventing perpetual check unless Black could reply by capturing it (for example, given bQd4, wKg1, and wRf8, the move Rf2 was taken as preventing perpetual check even though Black could in fact have replied by giving a simple perpetual check along the fourth rank). However, this did no harm; if Black can give perpetual check without allowing wR away from these squares, he is doing enough to to force the draw.

All this produced a list of positions from which Black could force perpetual check. If any reader questions whether the restriction of the wR to twelve squares was necessary, the answer is that the job could indeed have been done without it, but the reduced demand on computer memory speeded up program testing on my particular machine and the smaller output file simplified verification by eye.

The second-stage program took the list of "good" checks and analysed the study position in the light thereof. With White to play, each move in turn was considered, and if Black had a reply starting a perpetual check (or repeating a previous position) this was reported; otherwise, the move was played and it became Black's turn. With Black to play, each move was again considered, and if it was not a check, or if it could be met by capturing bQ, the resulting position was written to a file of White wins for verification; otherwise, the move was played and it became once more White's turn. The result was a pair of lists, one giving a Black drawing reply to each bad White move and the other giving positions in which White was believed to have a straightforward win. The third stage was to verify all these White wins, and this stage was divided into two parts. In the first part, all the positions for verification were submitted to the problem-testing program

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Popeye (Schnoebelen, Bartel, Geissler, Maeder, Linss, Höning, Brunzen) as mates in four. Popeye was chosen because it could be run automatically as soon as the second stage had finished; most contemporary problem-testing programs required the user to sit at the machine and press some keys, if only to start them off. In the second part, the output file from Popeye was examined, and those positions in which Popeye had failed to find a mate were analysed further. This analysis could have been carried through to the mate (even in the worst case, there was a mate in ten) but in practice it was simply verified that White could play to have K+R or better against a bare K with himself to move.

All this produced a fully computer-tested endgame study. The various computer files were taken to the WCSC on disc and could have been printed or displayed if necessary, but nobody asked to see them.

The verification of the White wins involved a certain amount of ad hoc work and is perhaps unlikely to be repeated in similar form. However, the first stage of the analysis, the proof that the defender can force perpetual check if the attacker makes a mistake, may find a wider application. A position with only three mobile men can be analysed on a PC with 640Kb of memory, and a position with four should be tractable on a university machine; and the analysis should not take more than a few hours.

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