

МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ
РОССИЙСКОЙ ФЕДЕРАЦИИ

ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ БЮДЖЕТНОЕ ОБРАЗОВАТЕЛЬНОЕ
УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ

**«БЕЛГОРОДСКИЙ ГОСУДАРСТВЕННЫЙ
ТЕХНОЛОГИЧЕСКИЙ УНИВЕРСИТЕТ им. В. Г. ШУХОВА»
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Кафедра программного обеспечения вычислительной техники и автоматизированных систем

Лабораторная работа №6
по дисциплине: Теория информации

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Задания:

Пользуясь описанием принципов работы метода LZW из ранее прикрепленных лекционных материалов, выполнить исследование особенностей данного метода кодирования. Для этого требуется:

1. Подготовить предварительно сообщения:

- длиной 1000 символов;
- длиной порядка 10000 символов.

Здесь могут быть использованы сообщения любого источника. Его тип необходимо указать. Важно - оба сообщения должны принадлежать источнику одного типа.

2. Подготовить сообщение длиной 10000 символов, отличающееся по природе (тип источника) от ранее подготовленного такой же длины.

3. Построить обработчик LZW.

4. Исследовать зависимость коэффициента сжатия от длины сообщения и его принадлежности к различным источникам.

Выполнение работы

```
import random

def hartley_source(length):
    return ''.join(str(random.randint(0, 1)) for _ in range(length))

def get_data(path):
    with open(path, 'r') as f:
        return f.read()

# кодирование
def lzw_compress(message):
    dictionary = {chr(i): i for i in range(256)}
    result = []
    buf = ""
    for c in message:
        wc = buf + c
        if wc in dictionary:
            buf = wc
        else:
            result.append(dictionary[buf])
            dictionary[wc] = len(dictionary)
            buf = c
    if buf:
        result.append(dictionary[buf])

    return result

# декодирование
def lzw_decompress(compressed):
    dictionary = {i: chr(i) for i in range(256)}
    result = ""
    prev_buf = chr(compressed.pop(0))
    result += prev_buf
    for k in compressed:
        buf = ""
        if k in dictionary:
            buf = dictionary[k]
        elif k == len(dictionary):
            buf = prev_buf + prev_buf[0]
        result += buf
        dictionary[len(dictionary)] = prev_buf + buf[0]
        prev_buf = buf
    return result

hartley_data_1k = hartley_source(1000)
hartley_data_10k = hartley_source(10000)
text_data = get_data('msg10k.txt')

# Применение LZW к сообщению и декомпрессия
print("Исходное сообщение длиной 1000 символов (Хартли):")
print(hartley_data_1k)
compressed_message_1000 = lzw_compress(hartley_data_1k)
print("Сообщение длиной 1000 символов (Хартли) с использованием LZW:")
print(compressed_message_1000)
decompressed_message_1000 = lzw_decompress(compressed_message_1000)
print("Декодированное сообщение длиной 1000 символов (Хартли):")
print(decompressed_message_1000)

print("Исходное сообщение длиной 10000 символов (Хартли):")
print(hartley_data_10k)
```

```

compressed_message_10000 = lzw_compress(hartley_data_10k)
print("Сообщение длиной 10000 символов (Хартли) с использованием LZW:")
print(compressed_message_10000)
decompressed_message_10000 = lzw_decompress(compressed_message_10000)
print("Декодированное сообщение длиной 10000 символов (Хартли):")
print(decompressed_message_10000)

print("Исходное сообщение длиной 10000 символов (текст):")
print(text_data)
compressed_message_10000_different = lzw_compress(text_data)
print("Сообщение длиной 10000 символов (текст) с использованием LZW:")
print(compressed_message_10000_different)
decompressed_message_10000_different =
lzw_decompress(compressed_message_10000_different)
print("Декодированное сообщение длиной 10000 символов (текст):")
print(decompressed_message_10000_different)

print("\n-----Замер-эффективности-сжатия-----
-----\n")

def compression_ratio(original_size, compressed_size):
    return original_size / compressed_size

# Оценка коэффициента сжатия для сообщений различных размеров и типов
original_size_1000 = len(hartley_data_1k)
original_size_10000 = len(hartley_data_10k)
original_size_10000_different = len(text_data)

compressed_size_1000 = len(compressed_message_1000)
compressed_size_10000 = len(compressed_message_10000)
compressed_size_10000_different = len(compressed_message_10000_different)

compression_ratio_1000 = compression_ratio(original_size_1000, compressed_size_1000)
compression_ratio_10000 = compression_ratio(original_size_10000, compressed_size_10000)
compression_ratio_10000_different = compression_ratio(original_size_10000_different,
compressed_size_10000_different)

print("Коэффициент сжатия для сообщения длиной 1000 символов (Хартли):",
compression_ratio_1000)
print("Коэффициент сжатия для сообщения длиной 10000 символов (Хартли):",
compression_ratio_10000)
print("Коэффициент сжатия для сообщения длиной 10000 символов (текст):",
compression_ratio_10000_different)

```

Результат работы программы:

Исходное сообщение длиной 1000 символов (Хартли):

```

111110101000011101101110111011101010111001110111010110101000111110111110100110100000100011000100111101
0010010001000000101000100111011100011000010001001111100011001001010000000000101001101000010000011000001
00100100000000010000001001001000010000010100010011110110010100111101010011000101000011110110001000100010
000101010011111001101001100111000001111111011000010110100011010001010000101000010110111001011110000001
001100101101101001111110011001000001110011110010000001100000100010110111110110110111001100000111011011
001111101001000111110000011000100101111100110111011000010000100000110110001011110010101100100111100001
110101111101010101100000011111000101000001110000010000110110110111011101011001000001110100001111101001
01000111011011011010010111010001111001011100011001101000001001011110010011000110111000101101100000110010
010001100011100111110010110010000011010000011011000100000001100001100100101011001101101000010000010011
001001011110000011000010000000101111100101010000101000100000001

```

Сообщение длиной 1000 символов (Хартли) с использованием LZW:

```

[49, 256, 256, 48, 49, 259, 48, 262, 259, 258, 265, 266, 260, 257, 264, 261, 257, 260, 264, 268, 265, 270, 268, 263, 272, 275, 269,
273, 276, 263, 261, 262, 258, 287, 287, 282, 289, 286, 293, 279, 293, 283, 267, 279, 273, 292, 286, 280, 299, 292, 278, 285, 307,
271, 290, 294, 300, 310, 285, 283, 301, 308, 312, 305, 316, 318, 306, 302, 282, 315, 297, 276, 297, 295, 312, 272, 270, 301, 300,
330, 309, 274, 288, 284, 338, 288, 299, 280, 266, 314, 274, 296, 322, 348, 311, 277, 338, 337, 317, 313, 275, 277, 290, 303, 332,
321, 340, 352, 317, 321, 329, 281, 344, 298, 332, 342, 351, 358, 339, 342, 341, 313, 302, 337, 328, 324, 345, 295, 314, 356, 289,
331, 309, 385, 326, 330, 327, 331, 278, 385, 384, 387, 336, 371, 382, 310, 368, 267, 394, 315, 396, 311, 393, 386, 371, 402, 378,
291, 373, 386, 341, 340, 294, 412, 269, 323, 304, 420, 271, 395, 355, 333, 334, 362, 352, 363, 422, 307, 344, 316, 304, 436, 325,
360, 404, 350, 382, 363, 367, 433, 335, 354, 343, 409, 335, 334, 308, 259]

```

Декодированное сообщение длиной 1000 символов (Хартли):

11111010100001110110111011101110110111001110111010110101000111110111110100110100000100011000100111101
0010010001000000101000100111011100011000010001001111100011001001010000000000101001101000010000011000001
00100100000000010000001001001000010000010100010011110110010100111101010011000101000011110110001000100010
0001010100111110011010011001110000011111111011000010111010001101000101000101000010110111001011110000001
00110010110110100111111100110010000011100111100100000001100000100010110111110110110111001100000111011011
001111110100100011111000001100010010111110011011101100001000010000011011000101111001010101100100111100001
11010111110101010110000001111110001010000011100000100001101101101110111101011001000001110100001111101001
01000111011011011010010111010001111001011100011001101000001001011110010011000110111000101101100000110010
01000110001110011111001011001000001101000001101100010000000110000110010010101100110101101000010000010011
001001011110000011000010000000101111100101010000101000100000001

Исходное сообщение длиной 10000 символов (Хартли):

00101101111010011100100101000000111010111011101111001010011110000101111010101001010011010000001101101001
1010000110101110010101111110011100111000011010010100011100010111000111110110101011110110001111011010010
01110101010101000001101111000100001100011100001100000001001101001010000011111100100111
11011111000010110010111000111101000110001101111100000000110001001100101011111001011010000101010101
0100100000011010000111010110001101111000000011000101101110101000001100011000001000001100000011
0111000111101011110000100011001111100110001111000111111111111100011010101011101001011
1110001010011000011010101000111001101111011011001101010000011110011000000000110100110100110101001111011
1101111000000010100100111011010000111111101011000000111001010011101111010111000111000011010111011010010
010000111000101111010001001111100100100100100011010101001011001001100100101011101011011101011101100
0011111100111011111010010100001111100110100011110010111101010110101011001110011000101000111000101
100101000111000001001010100100110101001000001000110011110100011011000011110000000111010101110010
000011110101100101111110000111001001011010010100000001101001111000011101100110101010011110010100110
00110010001011011110010100110111100011001100100111100001101111111111111101111001000011
100010100000110000111101101110010101101000011011110000000010001000001100011110000110
100110100010111011100110011110011001101111001111001101101000101100111111011100110000011011011000011011
010110111001110001110011101001011111101011110100100100001100100001110101010001011000011111000010000111
10000010110100110001011000011110111001100000110010000110011100000100011100001100011110000110
100110100010111011100110011110011001101111001111001101101000101100111111011100110000011011011000011011
010110111001110001110011101001011111101011110100100100001100100001110101010001011000011111000010000111
1000001011010011000101100001111011100110000011001000011001000011001110011011001100100010001100110010001000
101101011011100001110001001010110011101010000101111000011110001111011011111111001101010011100101
11111101010000110100010010111001100000011011011000101111100100010111101111110100011000101101000010010000
1010011101100011010111011110000010011001010001011101000011111111111000111100011101111000000100111011111
1011011101010011001110100010010100110001000100011100011101110100110011100001110000001010111111111101000
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110001101010001001001110010110100000111011000011110001011010001101001110101000011100010111011001
10111111011110011000000110111000001001001101100000011001101000001110100111101010100110010011111000011
100100010001000101101111011111000111110100101001011110100110010000000001100110010011001110001
1111001100110000001110001100011110100101001011110100101111010110010000000001100110010011001110001
001101010011110011100001010101010000011100100100001110100111101001000010001110110100010001100111000
00111101010011100111000010101010000011100100100001110100111101001101001101001101001101001101001101001
100110110110001110000010000110001010100100110011000100111100011010111101001111010011110100111101001
01010110111001101011011000110001000110000110000000001010101101111000101001000101101110000010101000101
0100110011000101111000101101100011110100111101111100000101100110011100101000111011010001
010100101000011100011010001001111010110010111101010100101000110110101111100000001111100010110010001001
0010100110011100001010000101011001101100100110110000110011001001001101110101101100111011011010101010
110111110100011100111001001101001000110000011000111000011110010001001101111100100000101110011110111101
0100010110000011111001111001101101110101110010011011010101101010111000011111111100110011101000
101111111000001100010110110100100011111010010001000001100110110010000011000110100101101110000100
11001111001110100010111010001011100000001000111100100100000001110110000010001001110011010110110101011000
00001100100101111100000100110000100111101000100100110001000100011010110110001010111101111100011100110000
10001111010110111001110001010111100110011000101000010010000110111111101000010011110100000000010001110110
11110000100111001011101111110011101100110001011111011101111101101110110010001110001011100011110011100
010111111111000110011110111011100010101100101001100101010110111000010010111100000100110101011101100111
011011111101111101011111011011100010101100110000111111011010010010011011000010001101101000000111101
1100100101110000000000000101010111100111010101111010011100101010101000000111111011000101000110100100011
1001100100111100110101010100100100001101110111100101000111001100101110110101110001110000000001110111011
1011111010111101000110100111001111001110111011011001100100110110111011000101110000000100101110000011101010
011110010000010101011110000011110100001100011001100111100100110001111001001110011110101010101000
01110011110001011010001000101101000101011010000100111010010111000010000110000101111001100000101111000111
11000000011111011110000000100111110010001101000011000000101101110010001101011111100100100101101000110101
1100110110111011000101100010100100100100110100000000000011101111101010101000011000011010110101011011
1011000011001011010101001110101010000110010110010110111011001000101011101001010010000000111100001011100
1010101111010010011110011000101110011000010010001000110110001010000000111100001011100

Сообщение длиной 10000 символов (Хартли) с использованием LZW:

806, 713, 823, 745, 552, 498, 842, 764, 660, 719, 390, 537, 457, 415, 400, 642, 868, 744, 632, 748, 674, 758, 684, 842, 876, 405, 671, 442, 681, 598, 855, 531, 563, 607, 432, 472, 589, 626, 841, 881, 572, 757, 675, 659, 882, 730, 838, 780, 423, 589, 740, 826, 893, 780, 451, 792, 804, 526, 458, 461, 588, 704, 596, 845, 372, 397, 579, 461, 450, 611, 816, 364, 593, 810, 751, 492, 621, 557, 489, 427, 500, 692, 929, 913, 459, 559, 764, 832, 523, 898, 865, 654, 861, 656, 905, 878, 427, 837, 783, 452, 901, 899, 503, 466, 486, 781, 661, 404, 490, 529, 791, 788, 736, 784, 927, 755, 522, 618, 492, 964, 963, 889, 612, 494, 686, 722, 866, 618, 962, 749, 928, 900, 966, 667, 738, 837, 629, 399, 604, 919, 474, 570, 664, 678, 963, 812, 625, 752, 480, 846, 973, 972, 494, 929, 585, 1004, 746, 902, 687, 671, 922, 676, 956, 470, 362, 849, 562, 609, 430, 812, 643, 854, 747, 684, 853, 795, 542, 830, 687, 862, 861, 926, 913, 628, 522, 962, 619, 665, 695, 903, 798, 937, 560, 537, 717, 507, 940, 722, 486, 626, 843, 726, 679, 882, 978, 839, 1025, 587, 1055, 639, 547, 902, 453, 721, 1036, 914, 1035, 939, 608, 1067, 772, 977, 815, 1019, 565, 1078, 974, 949, 817, 828, 893, 685, 345, 971, 1084, 1059, 876, 789, 888, 631, 773, 705, 911, 531, 592, 682, 815, 884, 1023, 752, 680, 869, 994, 688, 640, 1096, 698, 1094, 566, 935, 653, 1095, 775, 611, 544, 942, 999, 1060, 705, 767, 445, 777, 1120, 666, 1003, 654, 700, 987, 796, 425, 824, 803, 781, 795, 513, 794, 971, 957, 708, 1082, 573, 1106, 533, 630, 785, 457, 917, 657, 1037, 521, 553, 1024, 506, 584, 664, 724, 580, 655, 822, 672, 810, 1038, 558, 932, 974, 995, 1020, 1023, 1150, 622, 968, 480, 754, 581, 656, 1056, 1058, 792, 472, 897, 957, 723, 759, 1014, 567, 943, 331, 643, 737, 1080, 1016, 659, 755, 582, 707, 1185, 809, 354, 850, 491, 998, 593, 1015, 872, 827, 1190, 1168, 455, 1178, 532, 732, 931, 1173, 790, 811, 1083, 1215, 1063, 711, 467, 916, 790, 748, 1160, 1028, 715, 1002, 629, 880, 518, 502, 975, 799, 954, 1167, 482, 905, 355, 948, 890, 725, 803, 1246, 844, 569, 872, 530, 1197, 614, 948, 836, 460, 719, 600, 953, 1241, 1005, 798, 493, 581, 534, 1204, 1050, 1058, 1157, 964, 594, 809, 641, 590, 1109, 1096, 1104, 778, 943, 1158, 1054, 1008, 1125, 1187, 485, 743, 550, 960, 1126, 1055, 976, 960, 1015, 424, 1250, 663, 1272, 738, 945, 998, 639, 1054, 1295, 865, 890, 909, 995, 1258, 1265, 816, 1098, 723, 763, 1074, 907, 1257, 980, 828, 845, 874, 867, 1087, 1246, 1313, 1091, 941, 1197, 949, 541, 515, 634, 1278, 756, 1103, 451, 1030, 647, 1013, 1085, 1200, 747, 1067, 917, 638, 844, 766, 338, 697, 1222, 1306, 1326, 613, 1198, 1172, 715, 1195, 940, 1252, 1222, 1265, 415, 909, 556, 1348, 1134, 1077, 856, 818, 414, 1115, 756, 493, 1199, 1190, 540, 635, 921, 638, 733, 592, 1220, 1211, 1244, 1347, 800, 1094, 529, 520, 958, 1171, 726, 1387, 832, 1177, 1151, 1350, 1157, 831, 1038, 1286, 1300, 1225, 1212, 808, 576, 768, 1232, 925, 567, 1355, 769, 548, 1179, 1411, 1384, 555, 1306, 407, 1292, 847, 788, 630, 1017, 787, 1110, 574, 1016, 846, 1415, 1121, 1378, 1052, 762, 1213, 1354, 993, 1046, 443, 1398, 918, 766, 1227, 1326, 515, 505, 1165, 670, 1219, 396, 990, 1412, 413, 1106, 1101, 477, 900, 744, 586, 712, 770, 934, 1371, 1336, 1376, 797, 1352, 692, 1170, 859, 793, 1460, 1209, 1029, 551, 1327, 1457, 562, 546, 645, 717, 1108, 1045, 992, 1108, 1008, 958, 1069, 889, 904, 961, 1233, 796, 983, 1391, 622, 813, 482, 811, 918, 691, 1368, 600, 1370, 1076, 1421, 1327, 1403, 1281, 1221, 1344, 1331, 1192, 502, 1017, 1183, 1422, 1029, 863, 1438, 894, 930, 933, 1298, 1210, 993, 1047, 1177, 839, 1335, 1224, 757, 1001, 992, 1331, 644, 1449, 440, 955, 690, 778, 1387, 612, 823, 1369, 1065, 979, 1538, 1027, 1330, 1099, 999, 1436, 1486, 1409, 701, 1111, 690, 1068, 575, 1490, 1559]

Декодированное сообщение длиной 10000 символов (Хартли):

0010110111101001110010010100000011101011101110111001010011110000101111010101001010011010000001101101001
10100001101011100101011111100111001110000110100101000111000101110001111011010101110110001111011010010
0111010101010100000110111100010000110001110000110000001001101000000100101101001010000011111100100111
1101111100001011001011100011110100011000110111110000000110001001100110010111110010110100001010101011
01001000000110100001110101100011011110000000110001011011110101000001100011000001000001100000011
01110001111010111110000100011001111100110001111011111000101111000111011111111100011010101011101001011
1110001010011000011010100001100110111101011001101010000011110011000000000110100110100110100111011
110111100000001010010011101101010000011111101011000000110010100110111101011100011100001101011101010010
010000111000101111010001001111100100100100100011010101001011001001100100101011101011110101110101100
00111111001110111110100101000011111001101000111100101111010101010101001110011000101000110000111000101
10010100011100000100101010010011010100111011001000001000110011110100011011000011110000000111010101110010
000011110101100101111110000111001001010100101000000011010011110000111011001101010100111110010100110
001100100010110111100101001101110001100110010011110000101111111111110111100010011011111110101000011
1000101000001100001111011011100101010100001101111000000010001000001100011100000100011110000110
100110100010111011100110011110011001101111001101010001010011111101110011000001101101000011011
01011011100111000111001110100101111110101110100100100001100100001110101010001011000011111000010000111
100000101101001100010110000111011100110000011001000011001001001111000100000000100011110010110010001000
10110101101110000111000100101010001101101010000101111000011100011101101111111001101010011100101
111111010100001101000100101110011000000110110100010111100100010111011111010001100010101000010010000
101001110110001101011101111000001001100101000101110100001111111111000111100011101111000000100111011111
101101110101001100111010001001010011000100010001110001110111010011001110000111000000101011111111101000
01000100001010010010010011011001111011001110110111010010100111001000111001011000000010010101000111010
110001101010001001001110010110100000111011000011100010110100011010011101010000111100010111011001
10111111101111001100000011011100000100100110110000001100110100000111010011110101010100110010011111000011
1001000100010001011011110111100011111010010100101111010110010000000001100110010011001110001
11110011001100000011100011000111001101000110011001110010001011000100000100011001101100110100001000011010
00110101100111100111000010101010000011100100100001110100111101001000010001110111010100010001100111000
00111101010011100110110001111100001010110110100011011101001110101111110110011010100100010000111001011
1001110111000001111000010100100111101001100111101001110100011001000101000001000101001100001111001
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Исходное сообщение длиной 10000 символов (текст):

In one of the remote streets of Moscow, in a gray house with white columns, a mezzanine and a crooked balcony, once lived a lady, a widow, surrounded by numerous servants. Her sons served in St. Petersburg, her daughters got married; she rarely traveled and lived out the last years of her stingy and bored old age in seclusion. Her day, bleak and stormy, had long passed; but her

evening was blacker than night. Of all her servants, the most remarkable person was the janitor Gerasim, a man of twelve inches tall, built like a hero and deaf-mute from birth. The lady took him from the village, where he lived alone, in a small hut, separate from his brothers, and was considered almost the most serviceable draft peasant. Gifted with extraordinary strength, he worked for four people the matter was argued in his hands, and it was fun to look at him when he either plowed and, leaning with huge palms on the plough, it seemed, alone, without the help of a horse, cut the elastic chest of the earth, or on Peters day he acted so crushingly with a scythe that even a young man to sweep the birch forest from the roots down, or he deftly and nonstop thrashed with a three-pronged flail, and the oblong and hard muscles of his shoulders descended and rose like a lever. The constant silence gave solemn importance to his frantic work. He was a nice man, and if it hadnt been for his misfortune, any girl would have willingly married him... But Gerasim was brought to Moscow, they bought him boots, sewed a caftan for the summer, a sheepskin coat for the winter, gave him a broom and a shovel in his hands and identified him as a janitor. He did not like his new life very much at first. Since childhood, he has been accustomed to field work, to rural life. Alienated by his misfortune from the community of people, he grew mute and powerful, like a tree growing on a fertile land... Resettled in the city, he did not understand what was happening to him he was bored and perplexed, as a young, healthy bull, who had just been taken from a field where juicy grass grew up to his belly, was perplexed they took him, put him on a railway carriage and so, showering his fat body with smoke from with sparks, then with wavy steam, they are rushing him now, rushing with a bang and a squeal, but God knows where they are rushing to! Gerasims occupation of his new position seemed to him a joke after the hard work of the peasants; in half an hour everything was ready for him, and again he would stop in the middle of the yard and stare open-mouthed at all those passing by, as if wanting to get them to solve his mysterious situation, then suddenly he would go somewhere into a corner and, throwing his broom and shovel far away, throw himself face down on the ground and lie for hours motionless on his chest, like a trapped animal. But a person gets used to everything, and Gerasim finally got used to city life. He didnt have much to do.; his whole duty was to keep the yard clean, bring a barrel of water twice a day, carry and chop firewood for the kitchen and house, but not to let strangers in and watch at night. And I must say, he diligently fulfilled his duty: there were never any splinters or litter in his yard; whether a broken nag, a water cart, given under his command, would get stuck somewhere with a barrel in a dirty season, he would only move his shoulder - and not only the cart, but the horse itself would push off; whether there was firewood when he starts stabbing, his axe rings like glass, and shards and logs fly in all directions; and as for strangers, so after he caught two thieves one night, bumped their foreheads against each other, so much so that even if you didnt take them to the police later, everyone in the neighborhood began to respect him very much; even during the day, those who passed by were no longer scammers, but just strangers. at the sight of the formidable janitor, they waved and shouted at him, as if he could hear their screams. With the rest of the household, Gerasim was in a relationship not that friendly they were afraid of him but short: he considered them to be his own. They communicated with him by signs, and he understood them, followed all orders exactly, but he also knew his rights, and no one dared to sit in his place at the table. In general, Gerasim was of a strict and serious disposition, he loved order in everything; even the roosters did not dare to fight with him, otherwise it would be a disaster! He sees it, immediately grabs it by the legs, turns the wheel ten times in the air and throws it apart. There were geese in the ladys yard, too; but the goose, it is known, is an important and prudent bird; Gerasim felt respect for them, followed them and fed them; he himself looked like a sedate gander. They gave him a cubbyhole over the kitchen; he arranged it for himself, according to his taste, built in it a bed of oak planks on four blocks, a truly heroic bed; a hundred pounds could be put on it it would not bend; there was a hefty chest under the bed; in the corner there was a table of the same strong quality, and near the table there was a chair for three legs, but so sturdy and squat that Gerasim himself would pick it up, drop it and grin. The closet was locked with a lock that resembled a roll in its appearance, only black; Gerasim always carried the key to this lock on his belt. He didnt like to be visited. So a year passed, at the end of which a small incident happened to Gerasim. The old lady, with whom he lived in the janitors, followed ancient customs in everything and kept numerous servants; in her house there were not only laundresses, seamstresses, carpenters, tailors and dressmakers, there was even one saddler, he was also considered a veterinarian and a doctor for people, there was a home doctor for the mistress, there was Finally, there is a shoemaker named Kapiton Klimov, a drunkard named Gorky. Klimov considered himself an offended and unappreciated being, an educated and metropolitan man who would not live in Moscow, idle, in some backwater, and if he drank, as he himself expressed himself with deliberation and knocking on his chest, then he was already drinking out of grief. One day the lady and her head butler, Gavril, talked about him, a man who, judging by his yellow eyes and duck nose alone, fate itself seemed to have determined to be a commanding person. The lady regretted the spoiled morality of Kapiton, who had just been found somewhere on the street the day before. Well, Gavril, she suddenly began, shouldnt we marry him off, what do you think? Maybe hell settle down. Why not get married, sir! It is possible, sir, Gavril replied, and it will be very good, sir. Yes, but who will marry him? Of course, sir. However, as you wish, sir. Still, he may be needed for something, so to speak; you cant throw him out of a dozen. Does he seem to like Tatiana? Gavril wanted to object, but pressed his lips together. - yes!.. let him woo Tatiana, the lady decided, sniffing the tobacco with pleasure, do you hear? Im listening, sir, Gavril said and left. Returning to his room (it was in the wing and was almost completely cluttered with wrought-iron chests), Gavril first sent his wife out, and then sat down by the window and thought. The unexpected order of the lady apparently puzzled him. Finally he got up and ordered Kapiton to be called. Kapiton appeared... But before we pass on their conversation to the readers, we consider it useful to tell in a few words who this Tatiana was, whom Kapiton had to marry, and why the ladys command confused the butler. Tatiana, who, as we said above, was a laundress (however, as a skilled and learned laundress, she was entrusted with only fine linen), was a woman of about twenty years old, small, thin, blond, with moles on her left cheek. Moles on the left cheek are revered in Russia as a bad omen a foreshadowing of an unhappy life... Tatiana could not boast of her fate. From an early age, she was kept in a black body; she worked for two, but she never saw any affection; she was poorly dressed, she received the smallest salary; She didnt have any relatives anyway: one old housekeeper, left behind for unfitness in the village, was her uncle, and her other uncles were peasants, thats all. She was once reputed to be a beauty, but her beauty soon slipped away. She was of a very humble disposition, or, better to say, intimidated, she felt complete indifference to herself, was mortally afraid of others; she only thought about how to finish her work on time, never spoke to anyone and trembled at the very name of the lady, although she almost did not know her by sight. When Gerasim was brought from the village, she almost froze with horror at the sight of his huge figure, tried in every possible way not to meet him, even blinked, sometimes

when she happened to run past him, hurrying from home to the laundry. At first Gerasim did not pay much attention to her, then he began to laugh when he came across her, then he began to look at her, and finally he did not take his eyes off her at all. He fell in love with her; whether by the meek expression of her face, or by the timidity of her movements, God knows! One day she was making her way through the yard, carefully lifting the starched lady's jacket on her outstretched fingers... Someone suddenly grabbed her elbow hard; she turned around and screamed: Gerasim was standing behind her. Laughing stupidly and humming affectionately, he handed her a gingerbread cockerel with gold leaf on its tail and wings. She wanted to refuse, but he forcibly shoved it right into her hand, shook his head, walked away and, turning around, once again mumbled something very friendly to her. From that day on, he wouldn't let her rest: wherever she went, he was right there, walking towards her, smiling, mumbling, waving his hands, suddenly pulling the ribbon out of his bosom and thrusting it at her, clearing the dust in front of her with a

Сообщение длиной 10000 символов (текст) с использованием LZW:

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Декодированное сообщение длиной 10000 символов (текст):

In one of the remote streets of Moscow, in a gray house with white columns, a mezzanine and a crooked balcony, once lived a lady, a widow, surrounded by numerous servants. Her sons served in St. Petersburg, her daughters got married; she rarely traveled and lived out the last years of her stingy and bored old age in seclusion. Her day, bleak and stormy, had long passed; but her evening was blacker than night. Of all her servants, the most remarkable person was the janitor Gerasim, a man of twelve inches tall, built like a hero and deaf-mute from birth. The lady took him from the village, where he lived alone, in a small hut, separate from his brothers, and was considered almost the most serviceable draft peasant. Gifted with extraordinary strength, he worked for four people the matter was argued in his hands, and it was fun to look at him when he either plowed and, leaning with huge palms on the plough, it seemed, alone, without the help of a horse, cut the elastic chest of the earth, or on Peters day he acted so crushingly with a scythe that even a young man to sweep the birch forest from the roots down, or he deftly and nonstop thrashed with a three-pronged flail, and the oblong and hard muscles of his shoulders descended and rose like a lever. The constant silence gave solemn importance to his frantic work. He was a nice man, and if it hadnt been for his misfortune, any girl would have willingly married him... But Gerasim was brought to Moscow, they bought him boots, sewed a caftan for the summer, a sheepskin coat for the winter, gave him a broom and a shovel in his hands and identified him as a janitor. He did not like his new life very much at first. Since childhood, he has been accustomed to field work, to rural life. Alienated by his misfortune from the community of people, he grew mute and powerful, like a tree growing on a fertile land... Resettled in the city, he did not understand what was happening to him he was bored and perplexed, as a young, healthy bull, who had just been taken from a field where juicy grass grew up to his belly, was perplexed they took him, put him on a railway carriage and so, showering his fat body with smoke from with sparks, then with wavy steam, they are rushing him now, rushing with a bang and a squeal, but God knows where they are rushing to! Gerasims occupation of his new position seemed to him a joke after the hard work of the peasants; in half an hour everything was ready for him, and again he would stop in the middle of the yard and stare open-mouthed at all those passing by, as if wanting to get them to solve his mysterious situation, then suddenly he would go somewhere into a corner and, throwing his broom and shovel far away, throw himself face down on the ground and lie for hours motionless on his chest, like a trapped animal. But a person gets used to everything, and Gerasim finally got used to city life. He didnt have much to do.; his whole duty was to keep the yard clean, bring a barrel of water twice a day, carry and chop firewood for the kitchen and house, but not to let strangers in and watch at night. And I must say, he diligently fulfilled his duty: there were never any splinters or litter in his yard; whether a broken nag, a water cart, given under his command, would get stuck somewhere with a barrel in a dirty season, he would only move his shoulder - and not only the cart, but the horse itself would push off; whether there was firewood when he starts stabbing, his axe rings like glass, and shards and logs fly in all directions; and as for strangers, so after he caught two thieves one night, bumped their foreheads against each other, so much so that even if you didnt take them to the police later, everyone in the neighborhood began to respect him very much; even during the day, those who passed by were no longer scammers, but just strangers. at the sight of the formidable janitor, they waved and shouted at him, as if he could hear their screams. With the rest of the household, Gerasim was in a relationship not that friendly they were afraid of him but short: he considered them to be his own. They communicated with him by signs, and he understood them, followed all orders exactly, but

he also knew his rights, and no one dared to sit in his place at the table. In general, Gerasim was of a strict and serious disposition, he loved order in everything; even the roosters did not dare to fight with him, otherwise it would be a disaster! He sees it, immediately grabs it by the legs, turns the wheel ten times in the air and throws it apart. There were geese in the lady's yard, too; but the goose, it is known, is an important and prudent bird; Gerasim felt respect for them, followed them and fed them; he himself looked like a sedate gander. They gave him a cubbyhole over the kitchen; he arranged it for himself, according to his taste, built in it a bed of oak planks on four blocks, a truly heroic bed; a hundred pounds could be put on it it would not bend; there was a hefty chest under the bed; in the corner there was a table of the same strong quality, and near the table there was a chair for three legs, but so sturdy and squat that Gerasim himself would pick it up, drop it and grin. The closet was locked with a lock that resembled a roll in its appearance, only black; Gerasim always carried the key to this lock on his belt. He didn't like to be visited. So a year passed, at the end of which a small incident happened to Gerasim. The old lady, with whom he lived in the janitors, followed ancient customs in everything and kept numerous servants; in her house there were not only laundresses, seamstresses, carpenters, tailors and dressmakers, there was even one saddler, he was also considered a veterinarian and a doctor for people, there was a home doctor for the mistress, there was Finally, there is a shoemaker named Kapiton Klimov, a drunkard named Gorky. Klimov considered himself an offended and unappreciated being, an educated and metropolitan man who would not live in Moscow, idle, in some backwater, and if he drank, as he himself expressed himself with deliberation and knocking on his chest, then he was already drinking out of grief. One day the lady and her head butler, Gavril, talked about him, a man who, judging by his yellow eyes and duck nose alone, fate itself seemed to have determined to be a commanding person. The lady regretted the spoiled morality of Kapiton, who had just been found somewhere on the street the day before. Well, Gavril, she suddenly began, shouldn't we marry him off, what do you think? Maybe he'll settle down. Why not get married, sir! It is possible, sir, Gavril replied, and it will be very good, sir. Yes, but who will marry him? Of course, sir. However, as you wish, sir. Still, he may be needed for something, so to speak; you can't throw him out of a dozen. Does he seem to like Tatiana? Gavril wanted to object, but pressed his lips together. - yes!.. let him woo Tatiana, the lady decided, sniffing the tobacco with pleasure, do you hear? I'm listening, sir, Gavril said and left. Returning to his room (it was in the wing and was almost completely cluttered with wrought-iron chests), Gavril first sent his wife out, and then sat down by the window and thought. The unexpected order of the lady apparently puzzled him. Finally he got up and ordered Kapiton to be called. Kapiton appeared... But before we pass on their conversation to the readers, we consider it useful to tell in a few words who this Tatiana was, whom Kapiton had to marry, and why the lady's command confused the butler. Tatiana, who, as we said above, was a laundress (however, as a skilled and learned laundress, she was entrusted with only fine linen), was a woman of about twenty years old, small, thin, blond, with moles on her left cheek. Moles on the left cheek are revered in Russia as a bad omen a foreshadowing of an unhappy life... Tatiana could not boast of her fate. From an early age, she was kept in a black body; she worked for two, but she never saw any affection; she was poorly dressed, she received the smallest salary; She didn't have any relatives anyway: one old housekeeper, left behind for unfitness in the village, was her uncle, and her other uncles were peasants, that's all. She was once reputed to be a beauty, but her beauty soon slipped away. She was of a very humble disposition, or, better to say, intimidated, she felt complete indifference to herself, was mortally afraid of others; she only thought about how to finish her work on time, never spoke to anyone and trembled at the very name of the lady, although she almost did not know her by sight. When Gerasim was brought from the village, she almost froze with horror at the sight of his huge figure, tried in every possible way not to meet him, even blinked, sometimes when she happened to run past him, hurrying from home to the laundry. At first Gerasim did not pay much attention to her, then he began to laugh when he came across her, then he began to look at her, and finally he did not take his eyes off her at all. He fell in love with her; whether by the meek expression of her face, or by the timidity of her movements, God knows! One day she was making her way through the yard, carefully lifting the starched lady's jacket on her outstretched fingers... Someone suddenly grabbed her elbow hard; she turned around and screamed: Gerasim was standing behind her. Laughing stupidly and humming affectionately, he handed her a gingerbread cockerel with gold leaf on its tail and wings. She wanted to refuse, but he forcibly shoved it right into her hand, shook his head, walked away and, turning around, once again mumbled something very friendly to her. From that day on, he wouldn't let her rest: wherever she went, he was right there, walking towards her, smiling, mumbling, waving his hands, suddenly pulling the ribbon out of his bosom and thrusting it at her, clearing the dust in front of her with a

-----Замер-эффективности-сжатия-----

Коэффициент сжатия для сообщения длиной 1000 символов (Хартли): 5.0761421319796955

Коэффициент сжатия для сообщения длиной 10000 символов (Хартли): 7.662835249042145

Коэффициент сжатия для сообщения длиной 10000 символов (текст): 2.721525885558583

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