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[[0, 0.1735, 0.6209, 0.9942, 0.3642, 0.7733000000000001, 0.5556, 0.7007, 0.7281, 0.9407, 1.8088, 1.8215, 2.7643, 2.2446, 2.9581, 3.3516, 2.0906, 1.9825, 1.8147, 1.1781, 1.0167, 1.9424, 1.7530999999999999, 1.4970999999999999, 1.3571, 1.2402, 0.9618, 1.2801, 2.1814999999999998, 2.2439999999999998, 0.8204, 0.3569, 1.3393000000000002, 1.1433, 1.4087, 1.4578, 1.508], [0.1735, 0, 0.7944, 1.1677, 0.5377000000000001, 0.9468000000000001, 0.7291000000000001, 0.8742, 0.9016000000000001, 1.1142, 1.9823, 1.9949999999999999, 2.9377999999999997, 2.4181, 3.1316, 3.5251, 2.2641, 2.156, 1.9882, 1.3516, 1.1902, 2.1159, 1.9266, 1.6705999999999999, 1.5306, 1.4137, 1.1353, 1.4536, 2.355, 2.4175, 0.7754, 0.5304, 1.5128, 1.3168, 1.5822, 1.6313, 1.6815], [0.6209, 0.7944, 0, 1.3005, 0.6705, 1.0796000000000001, 0.8619, 1.1491, 1.0344, 1.2469999999999999, 2.1151, 2.1277999999999997, 3.0705999999999998, 2.5509, 3.2644, 3.6579, 2.3968999999999996, 2.2888, 2.121, 1.4844, 1.323, 2.5633, 2.1863, 1.8034, 1.6634, 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(37, 37)

37

number\_of\_edges = 58

edge\_pairs = [[0, 1], [0, 2], [0, 4], [0, 27], [0, 31], [1, 30], [2, 4], [2, 28], [2, 29], [2, 32], [2, 33], [2, 35], [3, 4], [3, 5], [3, 27], [4, 5], [4, 6], [4, 8], [4, 14], [4, 15], [4, 26], [4, 28], [5, 20], [6, 7], [7, 8], [7, 22], [7, 31], [8, 9], [8, 22], [9, 13], [9, 16], [9, 22], [9, 26], [10, 11], [10, 12], [10, 13], [10, 17], [10, 19], [11, 12], [11, 19], [13, 26], [14, 31], [15, 27], [18, 24], [19, 20], [19, 23], [19, 24], [20, 26], [21, 22], [21, 31], [24, 25], [25, 26], [27, 36], [29, 31], [30, 31], [32, 33], [33, 34], [35, 36]]

edge\_weights = [0.1735, 0.6209, 0.3642, 1.2801, 0.3569, 0.7754, 0.6705, 1.5606, 2.1042, 0.7184, 0.5224, 0.8369, 0.63, 0.3137, 0.5335, 0.4091, 0.1914, 0.3639, 2.5939, 2.9874, 0.5976, 2.0206, 0.2911, 0.2872, 0.435, 1.0524, 0.3438, 0.2126, 1.1519, 1.4614, 1.1499, 1.1881, 0.6254, 0.2957, 1.0537, 0.5257, 0.1737, 0.6307, 0.9428, 0.6434, 1.2828, 3.2181, 2.7392, 0.4576, 0.1614, 0.319, 0.2994, 0.0549, 0.5023, 1.5855, 0.1169, 0.2784, 0.2279, 1.8871, 0.4653, 0.5295, 0.2654, 0.2796]

controllers = [[4], [4, 15], [6, 14, 15], [0, 5, 14, 15], [2, 14, 15, 20, 31], [2, 8, 10, 14, 15, 22]]

switches = [0, 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36]

all\_pairs\_1 = [[4, 0], [4, 1], [4, 2], [4, 3], [4, 5], [4, 6], [4, 7], [4, 8], [4, 9], [4, 10], [4, 11], [4, 12], [4, 13], [4, 14], [4, 15], [4, 16], [4, 17], [4, 18], [4, 19], [4, 20], [4, 21], [4, 22], [4, 23], [4, 24], [4, 25], [4, 26], [4, 27], [4, 28], [4, 29], [4, 30], [4, 31], [4, 32], [4, 33], [4, 34], [4, 35], [4, 36]]

bea\_val = 18

bea\_val\_list = [18, 18]

con\_swi = [[], []]

con\_dist = [[0.3642, 3.3516], [0.5377000000000001, 3.5251], [0.6705, 3.6579], [0.63, 3.2727], [0.4091, 3.3965], [0.1914, 3.1788], [0.4786, 3.4659999999999997], [0.3639, 3.3513], [0.5765, 3.5639000000000003], [1.4445999999999999, 4.432], [1.4573, 4.4447], [2.4001, 5.3875], [1.8803999999999998, 4.8678], [2.5939, 5.581300000000001], [1.7264, 4.7138], [1.6182999999999998, 4.605700000000001], [1.4505, 4.4379], [0.8139, 3.8013], [0.6525, 3.6399], [2.0181, 5.0055], [1.5158, 4.5032], [1.1329, 4.1203], [0.9929, 3.9802999999999997], [0.876, 3.8634], [0.5976, 3.585], [1.1635, 2.7392], [2.0206, 5.008], [2.6082, 5.5956], [1.1846, 4.172], [0.7211000000000001, 3.7085], [1.3889, 4.3763000000000005], [1.1928999999999998, 4.1803], [1.4583, 4.4456999999999995], [1.5074, 3.2466999999999997], [1.3914, 2.9671]]

con\_swi = [[0, 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19], [20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36]]

bea\_val = 12

bea\_val\_list = [12, 12, 12]

con\_swi = [[], [], []]

con\_dist = [[0.5556, 2.9581, 3.3516], [0.7291, 3.1315999999999997, 3.5251], [0.8619, 3.2644, 3.6579], [0.8214, 3.2239, 3.2727], [0.1914, 2.5939, 2.9874], [0.6005, 3.003, 3.3965], [0.2872, 3.0725, 3.4659999999999997], [0.5553, 2.9578, 3.3513], [0.7679, 3.1704000000000003, 3.5639000000000003], [1.6360000000000001, 4.0385, 4.432], [1.6487, 4.0512, 4.4447], [2.5915, 4.994, 5.3875], [2.0718, 4.4742999999999995, 4.8678], [1.9178, 4.3203000000000005, 4.7138], [1.8097, 4.2122, 4.605700000000001], [1.6419000000000001, 4.0444, 4.4379], [1.0053, 3.4078, 3.8013], [0.8439, 3.2464, 3.6399], [1.8418999999999999, 4.612, 5.0055], [1.3396, 4.1097, 4.5032], [1.3243, 3.7268, 4.1203], [1.1843000000000001, 3.5868, 3.9802999999999997], [1.0674000000000001, 3.4699, 3.8634], [0.789, 3.1915, 3.585], [1.3549, 3.7574, 2.7392], [2.2119999999999997, 4.6145, 5.008], [2.5181, 5.1052, 5.5956], [1.0945, 3.6816000000000004, 4.172], [0.631, 3.2181, 3.7085], [1.5803, 3.9828, 4.3763000000000005], [1.3843, 3.7868000000000004, 4.1803], [1.6497000000000002, 4.0522, 4.4456999999999995], [1.6987999999999999, 4.1013, 3.2466999999999997], [1.5828, 3.9853, 2.9671]]

con\_swi = [[0, 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12], [13, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26], [27, 28, 29, 30, 31, 32, 33, 34, 35, 36]]

bea\_val = 9

bea\_val\_list = [9, 9, 9, 9]

con\_swi = [[], [], [], []]

con\_dist = [[0.1735, 0.9468000000000001, 3.1315999999999997, 3.5251], [0.6209, 1.0796000000000001, 3.2644, 3.6579], [0.9942, 0.3137, 3.2239, 3.2727], [0.3642, 0.4091, 2.5939, 2.9874], [0.5556, 0.6005, 2.7853, 3.1788], [0.7007, 0.8877, 3.0725, 3.4659999999999997], [0.7281, 0.773, 2.9578, 3.3513], [0.9407, 0.9714, 3.1704000000000003, 3.5639000000000003], [1.8088, 1.0832000000000002, 4.0385, 4.432], [1.8215, 1.0958999999999999, 4.0512, 4.4447], [2.7643, 2.0387, 4.994, 5.3875], [2.2446, 1.6089000000000002, 4.4742999999999995, 4.8678], [2.0906, 2.1212999999999997, 4.3203000000000005, 4.7138], [1.9825, 1.2569000000000001, 4.2122, 4.605700000000001], [1.8147, 1.1989, 4.0444, 4.4379], [1.1781, 0.4525, 3.4078, 3.8013], [1.0167, 0.2911, 3.2464, 3.6399], [1.9424, 2.4272, 4.612, 5.0055], [1.7530999999999999, 1.9249, 4.1097, 4.5032], [1.4970999999999999, 0.7715000000000001, 3.7268, 4.1203], [1.3571, 0.7413000000000001, 3.5868, 3.9802999999999997], [1.2402, 0.6244000000000001, 3.4699, 3.8634], [0.9618, 0.34600000000000003, 3.1915, 3.585], [1.2801, 0.8472, 3.7574, 2.7392], [2.1814999999999998, 2.4297, 4.6145, 5.008], [2.2439999999999998, 3.0173, 5.1052, 5.5956], [0.8204, 1.5937000000000001, 3.6816000000000004, 4.172], [0.3569, 1.1302, 3.2181, 3.7085], [1.3393000000000002, 1.798, 3.9828, 4.3763000000000005], [1.1433, 1.602, 3.7868000000000004, 4.1803], [1.4087, 1.8674000000000002, 4.0522, 4.4456999999999995], [1.4578, 1.3547, 4.1013, 3.2466999999999997], [1.508, 1.0751, 3.9853, 2.9671]]

con\_swi = [[1, 2, 4, 6, 7, 8, 9, 16, 21], [3, 10, 11, 12, 13, 17, 18, 19, 20], [22, 23, 24, 25, 26, 27, 28, 29, 30], [31, 32, 33, 34, 35, 36]]

bea\_val = 7

bea\_val\_list = [7, 7, 7, 7, 7]

con\_swi = [[], [], [], [], []]

con\_dist = [[0.6209, 2.9581, 3.3516, 1.0167, 0.3569], [0.7944, 3.1315999999999997, 3.5251, 1.1902, 0.5304], [1.3005, 3.2239, 3.2727, 0.6048, 1.3511000000000002], [0.6705, 2.5939, 2.9874, 0.6525, 0.7211000000000001], [1.0796000000000001, 3.003, 3.3965, 0.2911, 1.1302], [0.8619, 2.7853, 3.1788, 0.8439, 0.631], [1.1491, 3.0725, 3.4659999999999997, 1.1311, 0.3438], [1.0344, 2.9578, 3.3513, 0.8928999999999999, 0.7787999999999999], [1.2469999999999999, 3.1704000000000003, 3.5639000000000003, 0.6802999999999999, 0.9914], [2.1151, 4.0385, 4.432, 0.7921, 2.1657], [2.1277999999999997, 4.0512, 4.4447, 0.8048, 2.1784], [3.0705999999999998, 4.994, 5.3875, 1.7475999999999998, 3.1212], [2.5509, 4.4742999999999995, 4.8678, 1.3178, 2.4528], [2.3968999999999996, 4.3203000000000005, 4.7138, 1.8301999999999998, 2.1412999999999998], [2.2888, 4.2122, 4.605700000000001, 0.9658, 2.3394000000000004], [2.121, 4.0444, 4.4379, 0.9077999999999999, 2.1716], [1.4844, 3.4078, 3.8013, 0.1614, 1.5350000000000001], [2.5633, 4.612, 5.0055, 2.3707, 1.5855], [2.1863, 4.1097, 4.5032, 1.8683999999999998, 1.3961999999999999], [1.8034, 3.7268, 4.1203, 0.4804, 1.854], [1.6634, 3.5868, 3.9802999999999997, 0.4502, 1.7140000000000002], [1.5465, 3.4699, 3.8634, 0.3333, 1.5971000000000002], [1.2681, 3.1915, 3.585, 0.0549, 1.3187000000000002], [1.3444, 3.7574, 2.7392, 1.1383, 1.637], [1.5606, 4.6145, 5.008, 2.6731, 2.5384], [2.1042, 5.1052, 5.5956, 3.2607, 1.8871], [1.4413, 3.6816000000000004, 4.172, 1.8371, 0.4635], [0.7184, 3.9828, 4.3763000000000005, 2.0414, 1.6962000000000002], [0.5224, 3.7868000000000004, 4.1803, 1.8454, 1.5002], [0.7878000000000001, 4.0522, 4.4456999999999995, 2.1108, 1.7656], [0.8369, 4.1013, 3.2466999999999997, 1.6458000000000002, 1.8147], [1.1165, 3.9853, 2.9671, 1.3662, 1.8649]]

con\_swi = [[13, 16, 17, 18, 19, 23, 24], [25, 26, 27, 28, 29, 30, 32], [33, 34, 35, 36], [3, 4, 5, 9, 10, 11, 12], [0, 1, 6, 7, 8, 21, 22]]

bea\_val = 6

bea\_val\_list = [6, 6, 6, 6, 6, 6]

con\_swi = [[], [], [], [], [], []]

con\_dist = [[0.6209, 0.7281, 1.8088, 2.9581, 3.3516, 1.7530999999999999], [0.7944, 0.9016, 1.9823, 3.1315999999999997, 3.5251, 1.9265999999999999], [1.3005, 0.9939, 1.3969, 3.2239, 3.2727, 2.1458], [0.6705, 0.3639, 1.4445999999999999, 2.5939, 2.9874, 1.5158], [1.0796000000000001, 0.773, 1.0832000000000002, 3.003, 3.3965, 1.9249], [0.8619, 0.5553, 1.636, 2.7853, 3.1788, 1.3396], [1.1491, 0.435, 1.9232, 3.0725, 3.4659999999999997, 1.0524], [1.2469999999999999, 0.2126, 1.4724, 3.1704000000000003, 3.5639000000000003, 1.1881], [2.1277999999999997, 1.6977, 0.2957, 4.0512, 4.4447, 2.6731999999999996], [3.0705999999999998, 2.6405, 1.0537, 4.994, 5.3875, 3.6159999999999997], [2.5509, 1.674, 0.5257, 4.4742999999999995, 4.8678, 2.6494999999999997], [2.3968999999999996, 1.3624999999999998, 2.6223, 4.3203000000000005, 4.7138, 2.338], [2.2888, 1.8587, 0.1737, 4.2122, 4.605700000000001, 2.8342], [2.121, 1.6909, 1.3877000000000002, 4.0444, 4.4379, 2.6664000000000003], [1.4844, 1.0543, 0.6307, 3.4078, 3.8013, 2.0298], [1.323, 0.8928999999999999, 0.7921, 3.2464, 3.6399, 1.8683999999999998], [2.5633, 1.6542, 3.1628, 4.612, 5.0055, 0.5023], [1.8034, 1.3733, 0.9497, 3.7268, 4.1203, 2.3487999999999998], [1.6634, 1.2333, 0.9301, 3.5868, 3.9802999999999997, 2.2088], [1.5465, 1.1164, 1.0470000000000002, 3.4699, 3.8634, 2.0919], [1.2681, 0.838, 0.847, 3.1915, 3.585, 1.8135], [1.3444, 1.5274, 1.9304000000000001, 3.7574, 2.7392, 2.6793], [1.5606, 2.3845, 3.4652, 4.6145, 5.008, 3.5364], [2.1042, 2.6658999999999997, 4.0528, 5.1052, 5.5956, 3.2832999999999997], [1.4413, 1.2423, 2.6292, 3.6816000000000004, 4.172, 1.8597], [0.9778, 0.7787999999999999, 2.1657, 3.2181, 3.7085, 1.3961999999999999], [0.7184, 1.7528000000000001, 2.8335, 3.9828, 4.3763000000000005, 2.9047], [0.5224, 1.5568, 2.6375, 3.7868000000000004, 4.1803, 2.7087000000000003], [0.7878000000000001, 1.8222, 2.9029000000000003, 4.0522, 4.4456999999999995, 2.9741000000000004], [0.8369, 1.8713, 2.4379, 4.1013, 3.2466999999999997, 3.0232], [1.1165, 1.7553, 2.1583, 3.9853, 2.9671, 2.9072]]

con\_swi = [[0, 1, 16, 20, 23, 24], [3, 4, 5, 6, 7, 9], [11, 12, 13, 17, 18, 19], [25, 26, 27, 28, 29, 30], [31, 32, 33, 34, 35, 36], [21]]

switches\_assigned = [[[0, 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19], [20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36]], [[0, 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12], [13, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26], [27, 28, 29, 30, 31, 32, 33, 34, 35, 36]], [[1, 2, 4, 6, 7, 8, 9, 16, 21], [3, 10, 11, 12, 13, 17, 18, 19, 20], [22, 23, 24, 25, 26, 27, 28, 29, 30], [31, 32, 33, 34, 35, 36]], [[13, 16, 17, 18, 19, 23, 24], [25, 26, 27, 28, 29, 30, 32], [33, 34, 35, 36], [3, 4, 5, 9, 10, 11, 12], [0, 1, 6, 7, 8, 21, 22]], [[0, 1, 16, 20, 23, 24], [3, 4, 5, 6, 7, 9], [11, 12, 13, 17, 18, 19], [25, 26, 27, 28, 29, 30], [31, 32, 33, 34, 35, 36], [21]]]

all\_pairs\_2 = [[4, 0], [4, 1], [4, 2], [4, 3], [4, 5], [4, 6], [4, 7], [4, 8], [4, 9], [4, 10], [4, 11], [4, 12], [4, 13], [4, 14], [4, 16], [4, 17], [4, 18], [4, 19], [15, 20], [15, 21], [15, 22], [15, 23], [15, 24], [15, 25], [15, 26], [15, 27], [15, 28], [15, 29], [15, 30], [15, 31], [15, 32], [15, 33], [15, 34], [15, 35], [15, 36]]

Length of all\_pairs\_2 = 35

all\_pairs\_3 = [[6, 0], [6, 1], [6, 2], [6, 3], [6, 4], [6, 5], [6, 7], [6, 8], [6, 9], [6, 10], [6, 11], [6, 12], [14, 13], [14, 16], [14, 17], [14, 18], [14, 19], [14, 20], [14, 21], [14, 22], [14, 23], [14, 24], [14, 25], [14, 26], [15, 27], [15, 28], [15, 29], [15, 30], [15, 31], [15, 32], [15, 33], [15, 34], [15, 35], [15, 36]]

all\_pairs\_4 = [[0, 1], [0, 2], [0, 4], [0, 6], [0, 7], [0, 8], [0, 9], [0, 16], [0, 21], [5, 3], [5, 10], [5, 11], [5, 12], [5, 13], [5, 17], [5, 18], [5, 19], [5, 20], [14, 22], [14, 23], [14, 24], [14, 25], [14, 26], [14, 27], [14, 28], [14, 29], [14, 30], [15, 31], [15, 32], [15, 33], [15, 34], [15, 35], [15, 36]]

all\_pairs\_5 = [[2, 13], [2, 16], [2, 17], [2, 18], [2, 19], [2, 23], [2, 24], [14, 25], [14, 26], [14, 27], [14, 28], [14, 29], [14, 30], [14, 32], [15, 33], [15, 34], [15, 35], [15, 36], [20, 3], [20, 4], [20, 5], [20, 9], [20, 10], [20, 11], [20, 12], [31, 0], [31, 1], [31, 6], [31, 7], [31, 8], [31, 21], [31, 22]]

all\_pairs\_6 = [[2, 0], [2, 1], [2, 16], [2, 20], [2, 23], [2, 24], [8, 3], [8, 4], [8, 5], [8, 6], [8, 7], [8, 9], [10, 11], [10, 12], [10, 13], [10, 17], [10, 18], [10, 19], [14, 25], [14, 26], [14, 27], [14, 28], [14, 29], [14, 30], [15, 31], [15, 32], [15, 33], [15, 34], [15, 35], [15, 36], [22, 21]]

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Maximum Energy Saving = 37.93103448275862