Python 3.5.3 (v3.5.3:1880cb95a742, Jan 16 2017, 16:02:32) [MSC v.1900 64 bit (AMD64)] on win32

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>>>

 RESTART: C:\Users\Eley\Documents\ME 379 Comp Methods Optimization\HW2\genetic-algo\genetic-algo2.py

ELEY NG, HW2: GA Implementation

size interval 0.2222222222222222

pop_lst_bin ['000000', '000001', '000010', '000011', '000100', '000101', '000110', '000111', '001000', '001001', '001010', '001011', '001100', '001101', '001110', '001111', '010000', '010001', '010010', '010011', '010100', '010101', '010110', '010111', '011000', '011001', '011010', '011011', '011100', '011101', '011110', '011111', '100000', '100001', '100010', '100011', '100100', '100101', '100110', '100111', '101000', '101001', '101010', '101011', '101100', '101101', '101110', '101111', '110000', '110001', '110010', '110011', '110100', '110101', '110110', '110111', '111000', '111001', '111010', '111011', '111100', '111101', '111110', '111111']

pop_lst [-7.0, -6.777777777777778, -6.555555555555555, -6.333333333333333, -6.111111111111111, -5.888888888888889, -5.666666666666667, -5.444444444444445, -5.222222222222222, -5.0, -4.777777777777778, -4.555555555555555, -4.333333333333334, -4.111111111111111, -3.888888888888893, -3.666666666666667, -3.444444444444446, -3.2222222222222223, -3.0, -2.7777777777777777, -2.5555555555555554, -2.333333333333334, -2.1111111111111116, -1.888888888888893, -1.666666666666667, -1.444444444444446, -1.2222222222222223, -1.0, -0.7777777777777786, -0.5555555555555562, -0.3333333333333339, -0.1111111111111116, 0.11111111111111072, 0.3333333333333304, 0.5555555555555554, 0.7777777777777777, 1.0, 1.2222222222222214, 1.444444444444446, 1.666666666666666, 1.8888888888888893, 2.1111111111111107, 2.33333333333332, 2.5555555555555554, 2.77777777777777, 3.0, 3.2222222222222214, 3.444444444444446, 3.666666666666666, 3.888888888888875, 4.111111111111111, 4.33333333333332, 4.555555555555555, 4.777777777777777, 5.0, 5.222222222222221, 5.44444444444443, 5.666666666666666, 5.888888888888875, 6.111111111111111, 6.33333333333332, 6.555555555555555, 6.77777777777777, 7.0]

pop_d {'111010': 5.888888888888875, '011101': -0.5555555555555562, '001001': -5.0, '100110': 1.444444444444446, '101001': 2.1111111111111107, '110000': 3.666666666666666, '011111': -0.1111111111111116, '001010': -4.777777777777778, '101101': 3.0, '100010': 0.5555555555555554, '111101': 6.555555555555555, '001000': -5.222222222222222, '011000': -1.666666666666667, '111111': 7.0, '001110': -3.888888888888893, '101100': 2.77777777777777, '110011': 4.333333333333332, '100011': 0.7777777777777777, '000111': -5.444444444444445, '101011':

2.5555555555555554, '101111': 3.444444444444446, '010000': -3.444444444444446, '101000': 1.8888888888888893, '010011': -2.777777777777777, '110101': 4.77777777777777, '111110': 6.77777777777777, '011001': -1.444444444444446, '010111': -1.8888888888888893, '011100': -0.7777777777777786, '010100': -2.5555555555555554, '100101': 1.2222222222222214, '111100': 6.333333333333332, '101110': 3.222222222222214, '111011': 6.111111111111111, '011110': -0.3333333333333339, '000101': -5.88888888888889, '010110': -2.111111111111116, '000110': -5.66666666666667, '001011': -4.555555555555555, '100111': 1.666666666666666, '000100': -6.111111111111111, '010010': -3.0, '010101': -2.33333333333334, '001101': -4.111111111111111, '110100': 4.555555555555555, '110001': 3.8888888888888875, '000011': -6.333333333333333, '000010': -6.555555555555555, '110110': 5.0, '100100': 1.0, '110111': 5.222222222222221, '111000': 5.44444444444443, '100000': 0.11111111111111072, '000001': -6.777777777777778, '001111': -3.66666666666667, '011011': -1.0, '110010': 4.111111111111111, '000000': -7.0, '010001': -3.222222222222223, '111001': 5.666666666666666, '101010': 2.333333333333332, '011010': -1.222222222222223, '100001': 0.33333333333333304, '001100': -4.333333333333334}

length of pop_lst_bin 64

Gen 1: binary random initial pop rand_lst_bin ['010010', '000011', '011001', '001010', '000010', '100111', '001000', '010001', '101010', '110100']

Gen 1: random initial pop [-3.0, -6.333333333333333, -1.444444444444446, -4.777777777777778, -6.555555555555555, 1.666666666666666, -5.22222222222222, -3.222222222222223, 2.333333333333332, 4.555555555555555]

fitness val [-1.3088799919401328, -2.955428545673383, -0.11229277260835424, -3.1392209389024712, -2.879750370405556, -2.1342968466406536, -3.236406149964839, -1.5996780356465323, -1.9953081039605474, -1.0499274949355435]

Gen 1: min to max sorted list of fn [-3.236406149964839, -3.1392209389024712, -2.955428545673383, -2.879750370405556, -2.1342968466406536, -1.9953081039605474, -1.5996780356465323, -1.3088799919401328, -1.0499274949355435, -0.11229277260835424]

Sort max to min [-0.11229277260835424, -1.0499274949355435, -1.3088799919401328, -1.5996780356465323, -1.9953081039605474, -2.1342968466406536, -2.879750370405556, -2.955428545673383, -3.1392209389024712, -3.236406149964839]

elites cand ['010010', '000011']

MATING POOL generation

Candidate Design 1

r 0.05422033075740984

low (0.0) is lower than r = 0.05422033075740984 and high (0.0) is higher than r --> ACCEPT

Candidate Design 2

r 0.8166061267828358

low (0.008130699386562858) is lower than r = 0.8166061267828358 and high (0.008130699386562858) is higher than r --> ACCEPT

Candidate Design 3

r 0.9472237680584192

low (0.03163781955307007) is lower than r = 0.9472237680584192 and high (0.03163781955307007) is higher than r --> ACCEPT

Candidate Design 4

r 0.020879439400442457

REJECT candidate and replace with elite

Candidate Design 5

r 0.5101229864958065

low (0.15368087769828923) is lower than r = 0.5101229864958065 and high (0.15368087769828923) is higher than r --> ACCEPT

Candidate Design 6

r 0.5082383877312393

low (0.2575134980219273) is lower than r = 0.5082383877312393 and high (0.2575134980219273) is higher than r --> ACCEPT

Candidate Design 7

r 0.33533096649359084

REJECT candidate and replace with elite

Candidate Design 8

r 0.6650143866530914

low (0.5557057816924935) is lower than r = 0.6650143866530914 and high (0.5557057816924935) is higher than r --> ACCEPT

Candidate Design 9

r 0.21235430396843913

REJECT candidate and replace with elite

Candidate Design 10

r 0.9782916448152813

REJECT candidate and replace with elite

ORD_LST [-0.11229277260835424, -0.11229277260835424, -0.11229277260835424, -0.11229277260835424, -3.236406149964839, -3.1392209389024712, -2.955428545673383, -2.1342968466406536, -1.9953081039605474, -1.3088799919401328]

elites cand ['010010', '000011']

Mating pool for crossover & mutation ['011001', '001010', '000010', '100111', '001000', '010001', '101010', '110100']

No crossover: Parents = Children

mutate!!!

No crossover: Parents = Children

No crossover: Parents = Children

crossover!!!

New Child 1 101100 New Child 2 010110

Gen 2 Candidates ['010010', '000011', '011001', '001010', '000010', '100111', '001000', '010001', '101100', '010110']

Gen 2 Evaluated for fitness [-1.3088799919401328, -2.955428545673383, -0.11229277260835424, -3.1392209389024712, -2.879750370405556, -2.1342968466406536, -3.236406149964839, -1.5996780356465323, -1.7416444605368686, -0.36529270924773527]

resorted list [-3.236406149964839, -3.1392209389024712, -2.955428545673383, -2.879750370405556, -2.1342968466406536, -1.7416444605368686, -1.5996780356465323, -1.3088799919401328, -0.36529270924773527, -0.11229277260835424]

max -0.11229277260835424

MATING POOL generation

Candidate Design 1

r 0.42649121204996143

low (0.0) is lower than r = 0.42649121204996143 and high (0.0) is higher than r --> ACCEPT

Candidate Design 2

r 0.021712436096290033

low (0.007538897241319304) is lower than r = 0.021712436096290033 and high (0.007538897241319304) is higher than r --> ACCEPT

Candidate Design 3

r 0.5057881215739657

low (0.02933502509564882) is lower than r = 0.5057881215739657 and high (0.02933502509564882) is higher than r --> ACCEPT

Candidate Design 4

r 0.5299629435003246

low (0.057001696220070806) is lower than r = 0.5299629435003246 and high (0.057001696220070806) is higher than r --> ACCEPT

Candidate Design 5

r 0.5558497869290975

low (0.142495041304551) is lower than r = 0.5558497869290975 and high (0.142495041304551) is higher than r --> ACCEPT

Candidate Design 6

r 0.7910872491191512

low (0.2584474033324179) is lower than r = 0.7910872491191512 and high (0.2584474033324179) is higher than r --> ACCEPT

Candidate Design 7

r 0.5223349631303923

low (0.38541245213912895) is lower than r = 0.5223349631303923 and high (0.38541245213912895) is higher than r --> ACCEPT

Candidate Design 8

r 0.7988819723374345

low (0.5349354245796359) is lower than r = 0.7988819723374345 and high (0.5349354245796359) is higher than r --> ACCEPT

Candidate Design 9

r 0.8510404033944416

low (0.7576547968084667) is lower than r = 0.8510404033944416 and high (0.7576547968084667) is higher than r --> ACCEPT

Candidate Design 10

r 0.8836301368008996

REJECT candidate and replace with elite

ORD_LST [-0.11229277260835424, -3.236406149964839, -3.1392209389024712, -2.955428545673383, -2.879750370405556, -2.1342968466406536, -1.7416444605368686, -1.5996780356465323, -1.3088799919401328, -0.36529270924773527]

INDICES of sorted list [2, 9, 0, 7, 8, 5, 4, 1, 3, 6]

Gen 2 Candidates SORTED BEST TO WORST ['011001', '010110', '010010', '010001', '101100', '100111', '000010', '000011', '001010', '001000']

Mating pool for crossover & mutation ['010010', '010001', '101100', '100111', '000010', '000011', '001010', '001000']

crossover!!!

New Child 1 010011 New Child 2 001000

No crossover: Parents = Children

No crossover: Parents = Children

mutate!!!

crossover!!!

New Child 1 001000 New Child 2 010100

Gen 3 Candidates ['011001', '010110', '010011', '001000', '101100', '100111', '000010', '000011', '001000', '010100']

Gen 3 Evaluated for fitness [-0.11229277260835424, -0.36529270924773527, -1.0299604777347366, -3.236406149964839, -1.7416444605368686, -2.1342968466406536, -2.879750370405556, -2.955428545673383, -3.236406149964839, -0.7734794835010813]

resorted list [-3.236406149964839, -3.236406149964839, -2.955428545673383, -2.879750370405556, -2.1342968466406536, -1.7416444605368686, -1.0299604777347366, -0.7734794835010813, -0.36529270924773527, -0.11229277260835424]

max -0.11229277260835424

MATING POOL generation

Candidate Design 1

r 0.6333971070098747

low (0.0) is lower than r = 0.6333971070098747 and high (0.0) is higher than r --> ACCEPT

Candidate Design 2

r 0.5009036498247638

low (0.0) is lower than r = 0.5009036498247638 and high (0.0) is higher than r --> ACCEPT

Candidate Design 3

r 0.008677958440210132

REJECT candidate and replace with elite

Candidate Design 4

r 0.8355469507106299

low (0.04587586403107549) is lower than r = 0.8355469507106299 and high (0.04587586403107549) is higher than r --> ACCEPT

Candidate Design 5

r 0.8558889200791346

low (0.12516941707772575) is lower than r = 0.8558889200791346 and high (0.12516941707772575) is higher than r --> ACCEPT

Candidate Design 6

r 0.8729702536991745

low (0.2327131651935088) is lower than r = 0.8729702536991745 and high (0.2327131651935088) is higher than r --> ACCEPT

Candidate Design 7

r 0.7025962024602156

low (0.39146050216618833) is lower than r = 0.7025962024602156 and high (0.39146050216618833) is higher than r --> ACCEPT

Candidate Design 8

r 0.9370744142409774

low (0.568660899339324) is lower than r = 0.9370744142409774 and high (0.568660899339324) is higher than r --> ACCEPT

Candidate Design 9

r 0.19436518095483735

REJECT candidate and replace with elite

Candidate Design 10

r 0.16743251600006748

REJECT candidate and replace with elite

ORD_LST [-0.11229277260835424, -0.11229277260835424, -0.11229277260835424, -3.236406149964839, -3.236406149964839, -2.879750370405556, -2.1342968466406536, -1.7416444605368686, -1.0299604777347366, -0.7734794835010813]

INDICES of sorted list [0, 1, 9, 2, 4, 5, 6, 7, 3, 8]

Gen 3 Candidates SORTED BEST TO WORST ['011001', '010110', '010100', '010011', '101100', '100111', '000010', '000011', '001000', '001000']

Mating pool for crossover & mutation ['010100', '010011', '101100', '100111', '000010', '000011', '001000', '001000']

No crossover: Parents = Children

mutate!!!

crossover!!!

New Child 1 100111 New Child 2 101100

No crossover: Parents = Children

crossover!!!

New Child 1 001000 New Child 2 001000

Gen 4 Candidates ['011001', '010110', '010100', '010011', '100111', '101100', '000010', '000011', '001000', '001000']

Gen 4 Evaluated for fitness [-0.11229277260835424, -0.36529270924773527, -0.7734794835010813, -1.0299604777347366, -2.1342968466406536, -1.7416444605368686, -2.879750370405556, -2.955428545673383, -3.236406149964839, -3.236406149964839]

resorted list [-3.236406149964839, -3.236406149964839, -2.955428545673383, -2.879750370405556, -2.1342968466406536, -1.7416444605368686, -1.0299604777347366, -0.7734794835010813, -0.36529270924773527, -0.11229277260835424]

max -0.11229277260835424

MATING POOL generation

Candidate Design 1

r 0.4437766768157735

low (0.0) is lower than r = 0.4437766768157735 and high (0.0) is higher than r --> ACCEPT

Candidate Design 2

r 0.09464835762896506

low (0.0) is lower than r = 0.09464835762896506 and high (0.0) is higher than r --> ACCEPT

Candidate Design 3

r 0.36383122457573314

low (0.020215519915860555) is lower than r = 0.36383122457573314 and high (0.020215519915860555) is higher than r --> ACCEPT

Candidate Design 4

r 0.7585711353508172

low (0.04587586403107549) is lower than r = 0.7585711353508172 and high (0.04587586403107549) is higher than r --> ACCEPT

Candidate Design 5

r 0.0722875876569734

REJECT candidate and replace with elite

Candidate Design 6

r 0.21710398312620383

REJECT candidate and replace with elite

Candidate Design 7

r 0.36705314949186385

REJECT candidate and replace with elite

Candidate Design 8

r 0.7916312610940015

low (0.568660899339324) is lower than r = 0.7916312610940015 and high (0.568660899339324) is higher than r --> ACCEPT

Candidate Design 9

r 0.4168586300068159

REJECT candidate and replace with elite

Candidate Design 10

r 0.11093291819572615

REJECT candidate and replace with elite

ORD_LST [-0.11229277260835424, -0.11229277260835424, -0.11229277260835424, -0.11229277260835424, -0.11229277260835424, -3.236406149964839, -3.236406149964839, -2.955428545673383, -2.879750370405556, -0.7734794835010813]

INDICES of sorted list [0, 1, 2, 3, 5, 4, 6, 7, 8, 9]

Gen 4 Candidates SORTED BEST TO WORST ['011001', '010110', '010100', '010011', '101100', '100111', '000010', '000011', '001000', '001000']

Mating pool for crossover & mutation ['010100', '010011', '101100', '100111', '000010', '000011', '001000', '001000']

No crossover: Parents = Children

crossover!!!

New Child 1 100111 New Child 2 101100

No crossover: Parents = Children

No crossover: Parents = Children

Gen 5 Candidates ['011001', '010110', '010100', '010011', '100111', '101100', '000010', '000011', '001000', '001000']

Gen 5 Evaluated for fitness [-0.11229277260835424, -0.36529270924773527, -0.7734794835010813, -1.0299604777347366, -2.1342968466406536, -1.7416444605368686, -2.879750370405556, -2.955428545673383, -3.236406149964839, -3.236406149964839]

resorted list [-3.236406149964839, -3.236406149964839, -2.955428545673383, -2.879750370405556, -2.1342968466406536, -1.7416444605368686, -1.0299604777347366, -0.7734794835010813, -0.36529270924773527, -0.11229277260835424]

max -0.11229277260835424

MATING POOL generation

Candidate Design 1

r 0.30190881468263153

low (0.0) is lower than r = 0.30190881468263153 and high (0.0) is higher than r --> ACCEPT

Candidate Design 2

r 0.6453177152929582

low (0.0) is lower than r = 0.6453177152929582 and high (0.0) is higher than r --> ACCEPT

Candidate Design 3

r 0.012379691787330338

REJECT candidate and replace with elite

Candidate Design 4

r 0.1014983692842002

low (0.04587586403107549) is lower than r = 0.1014983692842002 and high (0.04587586403107549) is higher than r --> ACCEPT

Candidate Design 5

r 0.11698132575743736

REJECT candidate and replace with elite

Candidate Design 6

r 0.8423530117602054

low (0.2327131651935088) is lower than r = 0.8423530117602054 and high (0.2327131651935088) is higher than r --> ACCEPT

Candidate Design 7

r 0.3124854703157779

REJECT candidate and replace with elite

Candidate Design 8

r 0.49069816178208325

REJECT candidate and replace with elite

Candidate Design 9

r 0.8669427022816483

low (0.7752291455448328) is lower than r = 0.8669427022816483 and high (0.7752291455448328) is higher than r --> ACCEPT

Candidate Design 10

r 0.37465915698644636

REJECT candidate and replace with elite

ORD_LST [-0.11229277260835424, -0.11229277260835424, -0.11229277260835424, -0.11229277260835424, -0.11229277260835424, -3.236406149964839, -3.236406149964839, -2.879750370405556, -1.7416444605368686, -0.36529270924773527]

INDICES of sorted list [0, 1, 2, 3, 5, 4, 6, 7, 8, 9]

Gen 5 Candidates SORTED BEST TO WORST ['011001', '010110', '010100', '010011', '101100', '100111', '000010', '000011', '001000', '001000']

FINAL Candidates chromosomes ['011001', '010110', '010100', '010011', '101100', '100111', '000010', '000011', '001000', '001000']

FINAL Candidates variables [-1.444444444444446, -2.1111111111111116, -2.5555555555555554, -2.7777777777777777, 1.666666666666666, 2.777777777777777, -6.555555555555555, -6.333333333333333, -5.222222222222222, -5.222222222222222]

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