CEC-2017 Benchmark (F1-F30)	
Fx	Function Name
F1	Shifted and Rotated Bent Cigar Function
F2	Shifted and Rotated Sum of Different Power Function
F3	Shifted and Rotated Zakharov Function
F4	Shifted and Rotated Rosenbrock's Function
F5	Shifted and Rotated Rastrigin's Function
F6	Shifted and Rotated Schaffer F7 Function
F7	Shifted and Rotated Lunacek Bi-Rastrigin's Function
F8	Shifted and Rotated Non-Continuous Rastrigin's Function
F9	Shifted and Rotated Levy Function
F10	Shifted and Rotated Schwefel's Function
F11	Hybrid function 1
F12	Hybrid function 2
F13	Hybrid function 3
F14	Hybrid function 4
F15	Hybrid function 5
F16	Hybrid function 6
F17	Hybrid function 7
F18	Hybrid function 8
F19	Hybrid function 9
F20	Hybrid function 10
F21	Composition function 1
F22	Composition function 2
F23	Composition function 3
F24	Composition function 4
F25	Composition function 5
F26	Composition function 6
F27	Composition function 7
F28	Composition function 8
F29	Composition function 9
F30	Composition function 10

Life Cycle Genetic Algorithm (LCGA)					
CEC-2017 Statistical Results for 10D					
Fx	Best	Worst	Median	Mean	Std. Dev.
F1	6.06E+00	6.11E+03	5.32E+02	1.19E+03	1.50E+03
F2	5.79E-05	8.34E+03	4.08E-02	3.16E+02	1.29E+03
F3	4.78E-02	4.00E+03	9.52E+01	3.41E+02	7.07E+02
F4	8.17E-03	7.44E+01	5.93E+00	7.59E+00	1.33E+01
F5	9.95E-01	1.99E+01	9.95E+00	9.47E+00	3.53E+00
F6	1.49E-05	1.61E-01	4.96E-03	1.33E-02	2.60E-02
F7	1.29E+01	4.04E+01	2.46E+01	2.49E+01	6.85E+00
F8	9.95E-01	1.69E+01	7.96E+00	7.87E+00	3.19E+00
F9	6.00E-05	7.08E+01	4.82E+00	9.94E+00	1.34E+01
F10	3.75E-01	1.06E+03	5.38E+02	5.11E+02	2.43E+02
F11	1.98E+00	3.06E+01	1.00E+01	1.16E+01	5.88E+00
F12	2.15E+03	1.75E+06	1.38E+04	1.05E+05	3.34E+05
F13	9.18E+00	2.38E+04	5.09E+03	6.99E+03	6.36E+03
F14	6.30E+00	1.35E+04	4.19E+02	1.86E+03	3.14E+03
F15	9.87E+00	1.75E+04	1.07E+03	2.85E+03	4.19E+03
F16	2.67E-01	4.59E+02	1.21E+02	1.44E+02	9.07E+01
F17	8.67E-02	5.95E+01	8.44E+00	1.35E+01	1.35E+01
F18	1.98E+01	2.26E+04	5.74E+03	7.17E+03	6.01E+03
F19	2.17E+00	1.91E+04	1.58E+03	3.58E+03	4.45E+03
F20	1.98E-03	1.65E+01	2.31E+00	5.41E+00	5.36E+00
F21	1.01E+02	2.17E+02	1.09E+02	1.48E+02	5.25E+01
F22	1.01E+02	1.30E+02	1.06E+02	1.07E+02	4.73E+00
F23	3.04E+02	3.39E+02	3.21E+02	3.22E+02	7.84E+00
F24	1.00E+02	3.75E+02	3.51E+02	3.07E+02	9.71E+01
F25	3.98E+02	4.53E+02	4.47E+02	4.34E+02	2.23E+01
F26	9.95E-04	5.53E+02	3.56E+02	3.67E+02	9.80E+01
F27	3.75E+02	4.18E+02	3.91E+02	3.91E+02	9.05E+00
F28	3.00E+02	5.83E+02	4.07E+02	4.04E+02	9.57E+01
F29	2.44E+02	3.69E+02	2.84E+02	2.92E+02	2.67E+01
F30	2.39E+02	3.79E+05	4.18E+03	3.31E+04	6.83E+04

Life Cycle Genetic Algorithm (LCGA)					
CEC-2017 Statistical Results for 30D					
Fx	Best	Worst	Median	Mean	Std. Dev.
F1	2.36E+01	1.23E+04	2.61E+03	4.12E+03	3.77E+03
F2	1.32E+01	4.12E+11	7.40E+09	4.87E+10	9.70E+10
F3	7.21E+02	9.78E+03	2.56E+03	3.12E+03	2.11E+03
F4	3.86E+01	1.33E+02	9.91E+01	9.27E+01	2.06E+01
F5	3.88E+01	1.31E+02	7.96E+01	8.05E+01	1.83E+01
F6	9.05E-04	2.74E-01	1.14E-02	3.10E-02	4.80E-02
F7	9.06E+01	2.32E+02	1.54E+02	1.53E+02	3.08E+01
F8	5.17E+01	1.15E+02	7.16E+01	7.36E+01	1.65E+01
F9	2.19E+02	1.84E+03	6.30E+02	7.65E+02	4.11E+02
F10	1.57E+03	4.09E+03	2.87E+03	2.88E+03	5.42E+02
F11	2.54E+01	1.78E+02	1.01E+02	9.73E+01	3.69E+01
F12	7.48E+04	5.19E+06	1.05E+06	1.25E+06	9.14E+05
F13	1.28E+02	3.42E+04	7.85E+03	9.23E+03	7.87E+03
F14	2.32E+03	1.77E+06	1.98E+05	2.72E+05	2.84E+05
F15	3.78E+01	2.00E+04	1.29E+03	3.54E+03	4.71E+03
F16	7.42E+02	1.81E+03	1.28E+03	1.24E+03	2.72E+02
F17	2.76E+02	1.00E+03	5.90E+02	6.16E+02	1.75E+02
F18	2.77E+04	5.58E+06	3.67E+05	9.26E+05	1.21E+06
F19	6.40E+01	2.99E+04	3.26E+03	5.10E+03	5.72E+03
F20	1.53E+02	9.87E+02	4.41E+02	4.46E+02	2.01E+02
F21	2.42E+02	3.14E+02	2.78E+02	2.78E+02	1.71E+01
F22	1.00E+02	3.09E+03	1.00E+02	1.59E+02	4.19E+02
F23	4.28E+02	6.31E+02	4.85E+02	4.90E+02	3.97E+01
F24	5.71E+02	8.30E+02	6.70E+02	6.83E+02	7.13E+01
F25	3.79E+02	4.43E+02	3.90E+02	4.01E+02	2.10E+01
F26	2.00E+02	4.21E+03	2.60E+03	2.31E+03	1.02E+03
F27	4.58E+02	5.52E+02	4.92E+02	4.91E+02	1.72E+01
F28	3.97E+02	4.92E+02	4.28E+02	4.35E+02	2.55E+01
F29	3.91E+02	1.12E+03	8.02E+02	8.02E+02	1.79E+02
F30	2.29E+02	8.03E+03	5.70E+02	1.10E+03	1.35E+03

Life Cycle Genetic Algorithm (LCGA)					
CEC-2017 Statistical Results for 50D					
Fx	Best	Worst	Median	Mean	Std. Dev.
F1	1.67E+02	1.20E+04	1.04E+03	2.41E+03	3.03E+03
F2	2.33E+08	5.67E+16	3.88E+12	1.19E+15	7.93E+15
F3	4.18E+03	2.23E+04	1.04E+04	1.05E+04	4.05E+03
F4	1.92E+00	2.60E+02	9.67E+01	1.24E+02	5.72E+01
F5	1.18E+02	2.30E+02	1.83E+02	1.83E+02	2.51E+01
F6	3.45E-03	2.70E-01	2.64E-02	3.99E-02	4.50E-02
F7	2.25E+02	4.53E+02	3.05E+02	3.22E+02	5.70E+01
F8	1.21E+02	2.63E+02	1.77E+02	1.79E+02	3.05E+01
F9	9.77E+02	5.32E+03	3.26E+03	3.22E+03	1.02E+03
F10	3.26E+03	7.11E+03	4.83E+03	4.90E+03	7.58E+02
F11	1.00E+02	1.80E+03	1.94E+02	3.17E+02	3.41E+02
F12	6.34E+05	9.12E+06	3.33E+06	3.32E+06	1.77E+06
F13	1.83E+02	1.00E+04	1.06E+03	2.28E+03	2.58E+03
F14	8.01E+04	4.79E+06	7.05E+05	1.02E+06	9.67E+05
F15	9.35E+01	1.34E+04	2.24E+03	3.41E+03	3.51E+03
F16	1.02E+03	3.21E+03	1.87E+03	1.82E+03	4.86E+02
F17	6.89E+02	2.38E+03	1.47E+03	1.47E+03	3.81E+02
F18	1.78E+05	5.21E+06	2.25E+06	2.40E+06	1.21E+06
F19	4.25E+01	2.76E+04	1.13E+04	1.18E+04	6.37E+03
F20	3.59E+02	1.87E+03	1.08E+03	1.10E+03	3.03E+02
F21	3.35E+02	4.98E+02	3.87E+02	3.92E+02	3.73E+01
F22	1.00E+02	7.29E+03	5.93E+03	5.48E+03	1.55E+03
F23	6.19E+02	1.01E+03	7.54E+02	7.64E+02	8.78E+01
F24	9.09E+02	1.45E+03	1.08E+03	1.10E+03	1.29E+02
F25	5.26E+02	6.10E+02	5.68E+02	5.66E+02	2.34E+01
F26	3.01E+02	6.64E+03	4.96E+03	4.89E+03	9.51E+02
F27	4.47E+02	9.97E+02	5.02E+02	5.89E+02	1.50E+02
F28	4.84E+02	6.42E+02	5.40E+02	5.47E+02	3.80E+01
F29	5.60E+02	1.81E+03	1.17E+03	1.20E+03	3.10E+02
F30	2.93E+02	1.29E+04	1.80E+03	3.29E+03	3.40E+03

Life Cycle Genetic Algorithm (LCGA)					
CEC-2017 Statistical Results for 100D					
Fx	Best	Worst	Median	Mean	Std. Dev.
F1	1.12E+03	2.31E+04	4.96E+03	6.24E+03	4.84E+03
F2	6.30E+26	1.13E+42	6.58E+35	2.43E+40	1.58E+41
F3	2.86E+04	7.76E+04	4.66E+04	4.61E+04	9.49E+03
F4	1.82E+02	4.70E+02	3.03E+02	3.12E+02	5.83E+01
F5	4.61E+02	6.54E+02	5.56E+02	5.50E+02	4.99E+01
F6	1.24E-02	1.32E-01	3.11E-02	3.86E-02	2.32E-02
F7	7.11E+02	1.18E+03	9.16E+02	9.22E+02	1.11E+02
F8	4.68E+02	7.35E+02	5.85E+02	5.80E+02	6.04E+01
F9	8.71E+03	1.88E+04	1.38E+04	1.37E+04	2.03E+03
F10	9.62E+03	1.52E+04	1.19E+04	1.19E+04	1.18E+03
F11	7.90E+02	6.88E+03	2.00E+03	2.18E+03	1.18E+03
F12	5.41E+06	3.49E+07	1.20E+07	1.35E+07	5.80E+06
F13	4.60E+02	9.08E+03	2.54E+03	2.90E+03	1.97E+03
F14	5.02E+05	4.21E+06	1.60E+06	1.64E+06	7.32E+05
F15	2.70E+02	1.24E+04	1.57E+03	2.08E+03	2.22E+03
F16	2.93E+03	5.39E+03	4.55E+03	4.46E+03	5.59E+02
F17	2.19E+03	4.43E+03	3.38E+03	3.34E+03	5.00E+02
F18	4.85E+05	4.13E+06	1.50E+06	1.56E+06	7.84E+05
F19	1.31E+02	7.54E+03	6.57E+02	1.19E+03	1.27E+03
F20	1.54E+03	4.40E+03	3.07E+03	3.08E+03	5.81E+02
F21	6.32E+02	9.24E+02	7.88E+02	7.90E+02	5.91E+01
F22	1.00E+02	1.67E+04	1.34E+04	1.31E+04	2.22E+03
F23	8.50E+02	1.18E+03	9.74E+02	9.90E+02	7.13E+01
F24	1.49E+03	2.11E+03	1.77E+03	1.78E+03	1.40E+02
F25	7.15E+02	9.33E+02	8.25E+02	8.27E+02	5.20E+01
F26	3.00E+02	1.84E+04	1.36E+04	1.34E+04	3.35E+03
F27	5.00E+02	1.17E+03	7.91E+02	7.84E+02	1.74E+02
F28	5.00E+02	7.30E+02	6.48E+02	6.42E+02	5.93E+01
F29	2.13E+03	4.05E+03	3.37E+03	3.30E+03	4.02E+02
F30	5.20E+02	2.38E+04	4.48E+03	5.27E+03	3.89E+03