

OBJECTIVE : To be able to implement the GA Selection, Recombination and Mutation in Python code and evaluate solutions generated after each operator

OUTPUT : Python Code and Short Write up

TYPE OF PROJECT: Individual

Program SPECIFICATIONS

1. Use the test function called Ackley function for this programming exercise. Pls see the link <https://www.sfu.ca/~ssurjano/ackley.html> for the form of the function. Also note the upper and lower bounds of the function. This can also be seen in the link given.
2. You may use the python codes shown in class to implement the GA selection, Recombination and Mutation. You may also edit the codes to achieve the specifications in this programming exercise.
3. Use the uniform crossover method.
4. Use the inversion mutation.
5. Use 5 dimensions for each solution and randomly generate 10 members of the population.
6. The outputs of your selection operator **must be fed** into the recombination operator.
7. The outputs of your recombination operator **must also be fed** into the mutation operator.
8. Print the before the after state of the solution. This means you must print the vector of the solution and also include its objective function values (fitness values). Please note that in the lecture videos in the python codes, the fitness values were not printed. In this programming exercise, you need to print them.

e.g.

After generation of population

```
solution 1 : [...]  
fitness of solution 1 : ...  
solution 2 : [...]  
fitness of solution 2 : ...  
...until solution 10...
```

Selected Parents

```
Selected_parent 1 : [...]  
fitness of Selected_parent 1 : ...  
Selected_parent 2 : [...]  
fitness of Selected_parent 2 : ...
```

After Recombination

```
baby 1 : [...]  
fitness of baby 1 : ...  
baby 2 : [...]  
fitness of baby 2 : ...
```

After mutation

```
Mutated_baby 1 : [...]  
fitness of Mutated_baby 1 : ...  
Mutated_baby 2 : [...]  
fitness of Mutated_baby 2 : ...
```

9. Write a short observation on the fitness values after the recombination operator and after the mutation operator. Concentrate your discussion on whether there was improvement in the new solutions generated. Please write between 3-5 sentences only.
10. Place the write up in a word or pdf file. Filename sample gamot_operators.doc or gamot_operators.pdf.
11. Filename of the python code should be gamot_operators.py.
12. Zip the two files together. Filename sample is gamot_opertors.zip. Upload the zip file in the assignment prompt in our class LMS.