REWARD: 90% points ¡img src=../../Media/Icons/statusPending3.jpg¿

I really want people to successfully complete each assignment. This is an optional makeup version of assignments 1, 2, and 3.

If you did not like your grade for any of the listed assignments you can redo the assignment for 90% grade provided you get an answer similar to the ones given below. Submissions will available labeled with the suffix "(retry)". Times will be extended a little bit to be lenient. You must get the results 100% correct to collect the reward. I have office hours or you can make an appointment if you are having difficulties.

1 Assignment 1

This was an assignment doing simple local search in two different representations and three different mutation operators. The point was to show how important it is to match representation with mutation operators and how you don't necessarily get the true optimum if the representation can't represent the true optimum.

The output I am looking for is:

Rep	Mut	Unique Opt	Reasoning
0	0	about 300	random probing. neighborhood is all of space
1	0	about 300	random probing. neighborhood is all of space
0	1	24	the mismatch of mutate and representation gives 24 local optima
1	1	1	good combination of exploitation and exploration
0	2	1	good combination of exploitation and exploration
1	2	about 1000	mismatch of mutate and representation gives poor exploration

Estimated time to run test: around 2.8 sec
Time given: 10 seconds

2 Assignment 2

In this assignment we were doing a 0-1 Knapsack Problem. We are solving until the answer is within 99.995% of the expected maximum weight. The output I am expecting is:

The output I am looking for is:

1. the program must not time out.
2. the program must produce the correct answers for the output where the answer is printed:

```
first problem
..XXXXX.XX.   7 X's with an optional 8th one if it is the last X: ..XXXXX.XXX

second problem
..X....XXX           499.990000

third problem
........X.X....X.X.. 499.980000
```

3. must produce an average answer for each triple attempt experiment. That is, it can't run out of generations on all three attempts which generates an divide by zero because there is nothing to average.

Estimated time to run test: around 3.8 sec to get to 99.995% (that's four 9's and a 5)
Time given: 20 seconds

3 Assignment 3

This assignment is to discover the key that was used to encrypt the message. It is not to find the key that is used to decrypt the message although you can decrypt the message with either. You can reverse the mapping of the key if you need to get the key in the right form.

Your program is run three times on each of ten encoded examples.

- It is expected to break the moby code completely (no letters out of place) most of the time. For mutation try a simple single swap of two letters. For xover find a cycle between two parents and swap the cycle.
- It is expected to perform similarly or better than the stats below.
- It is expected to finish all tests in the time allotted.

Here are some performance numbers for a simple permeation GA with no local search and small punishment for letter pairs that do not occur in English. The median is 2.0, mean 3.3, and stddev 5.039.

```
FILES: zans and e237.key   NUM DIFFS: 6
FILES: zans and e237.key   NUM DIFFS: 7
FILES: zans and e237.key   NUM DIFFS: 7
FILES: zans and f387.key   NUM DIFFS: 2
FILES: zans and f387.key   NUM DIFFS: 3
FILES: zans and f387.key   NUM DIFFS: 4
FILES: zans and h472.key   NUM DIFFS: 3
FILES: zans and h472.key   NUM DIFFS: 3
FILES: zans and h472.key   NUM DIFFS: 3
FILES: zans and i603.key   NUM DIFFS: 2
FILES: zans and i603.key   NUM DIFFS: 4
FILES: zans and i603.key   NUM DIFFS: 2
FILES: zans and u659.key   NUM DIFFS: 0
FILES: zans and u659.key   NUM DIFFS: 2
FILES: zans and u659.key   NUM DIFFS: 0
FILES: zans and o715.key   NUM DIFFS: 5
FILES: zans and o715.key   NUM DIFFS: 18
FILES: zans and o715.key   NUM DIFFS: 22
FILES: zans and j945.key   NUM DIFFS: 2
FILES: zans and j945.key   NUM DIFFS: 2
FILES: zans and j945.key   NUM DIFFS: 2
FILES: zans and w1126.key   NUM DIFFS: 0
FILES: zans and w1126.key   NUM DIFFS: 0
FILES: zans and w1126.key   NUM DIFFS: 0
FILES: zans and n2976.key   NUM DIFFS: 0
FILES: zans and n2976.key   NUM DIFFS: 0
FILES: zans and n2976.key   NUM DIFFS: 0
FILES: zans and moby8043.key   NUM DIFFS: 0
FILES: zans and moby8043.key   NUM DIFFS: 0
FILES: zans and moby8043.key   NUM DIFFS: 0
```

Estimated time to run test: about 2 sec times 30 tests Time given: 150 seconds plus 5 sec per test

3.1 Grading this Assignment

I will grade this based first be seeing that your code compiles, runs and returns a sensible answer. Please turn in code that runs. Code that doesn't run gets almost no points. Please stick to the example format. I will read the report to make sure it is clear and that you understand what happened when you ran the experiments. 50be concise, to the point, and readable.

3.2 Submission

Homework will be submitted as an uncompressed tar file to the homework submission page linked from the main class page. You can submit as many times as you like. The LAST file you submit BEFORE the deadline will be the one graded. There are no late papers. For all submissions you will receive email giving you some automated feedback on the unpacking and compiling and running of code and possibly some other things that can be autotested. I will read the results of the runs and the reports you submit.

Have fun.