COMP5232

Designing an Evolutionary Algorithm

Steps to design a *robust* Evolutionary Search:

The main points you will need to address will be:

1. Make sure you **understand** the Problem!
   - Decide what the **solution** to the problem will be.
   - Define exactly how it should look like.
   - Define exactly how to tell how good/suitable a particular solution is.

2. Design the Chromosome Structure so that:
   - Encodes **all** possible the solutions.
   - Can be easily Manipulated (crossover and mutation).
   - Can be easily tested for fitness (each individual).
   - Always represents a **viable** solution.

3. Describe in detail how to create the initial population.
   - Using random operations.
   - If it is easy (ideally trivial) then it validates the structure of the chromosome.

4. Describe in detail how to measure fitness and with respect to what.
   - Fitness will guide evolution, so **what** does it measures defines **what** answer you get.
   - Define the resources need for this evaluation (simulator, computing resources, etc.)
   - If it can coherently evaluate any instance of a chromosome, then it validates the structure again.

5. Describe in detail how each genetic operator will be applied.
   - How to implement selection.
   - How to apply Crossover.
   - How to apply Mutation.
   - If Crossover and Mutation are straight forward and always create a new **viable** chromosome, then it serves to validate its structure once again.

6. Describe your termination criteria.

Remember to use points 3-5 (and describe how you did it) to validate the different aspects of the Chromosome.

An additional research methods point is to **validate** your results.

MAG.