

## Checkpoint 3 -- Genotype / Phenotype

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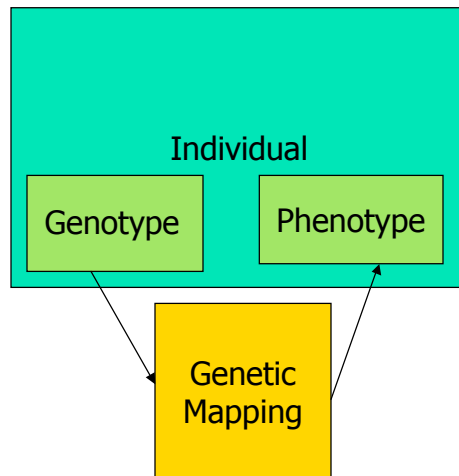
## What you will be doing

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- Start coding up the EA for your problem
  
- Goals:
  - Experiment with different genotypes
  - Experiment with different genetic mapping.
  - Start thinking about generation of statistics.

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## Define our individual



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## Task

- Define two different classes of individual
  - First: Your first choice of genotype.
  - Second: use standard GA genotype (bit string, or int/float array)
- Phenotype will be the same for both individuals.

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## Generation 0

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- Must randomly initialize 0th generation with random individuals.
  - Recall that you are creating random genomes \*not\* phenotypes instances.

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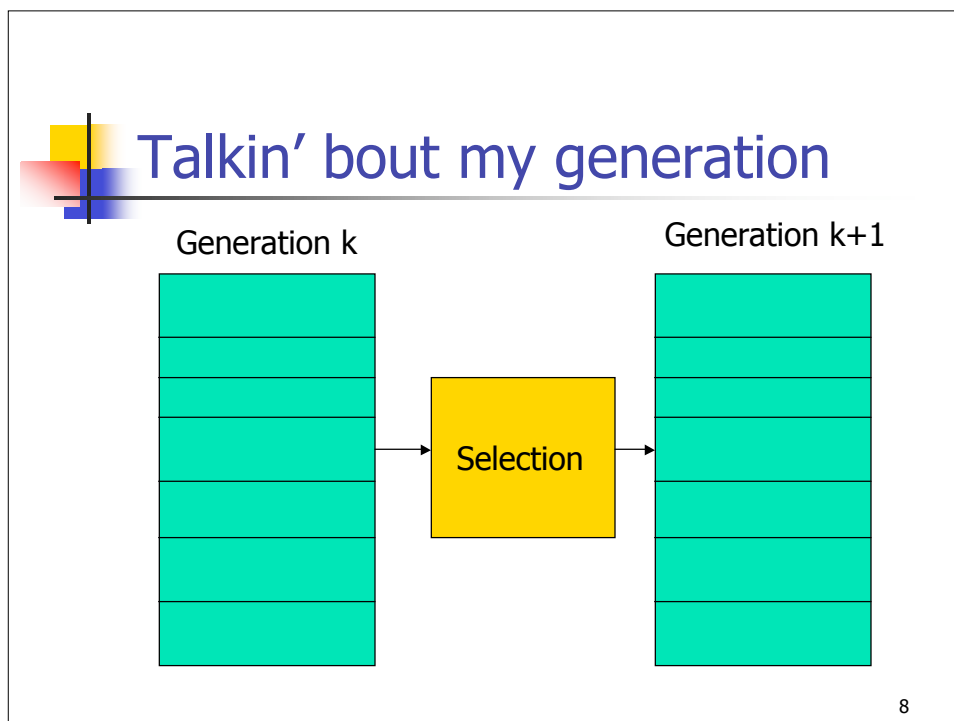
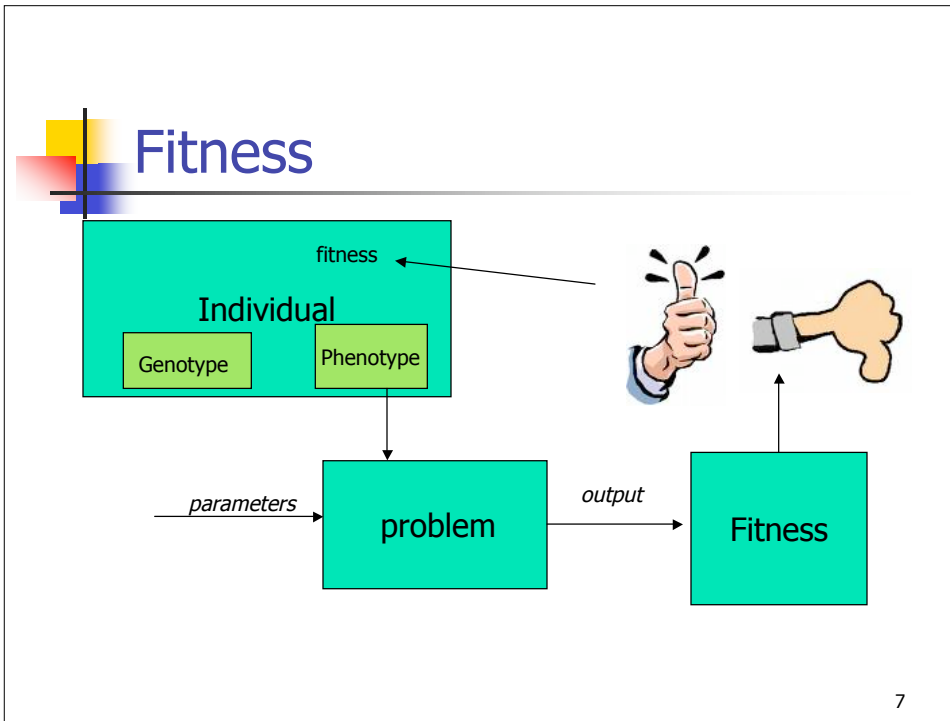


## Task

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- Genetic Mapping
  - Obviously, genetic mapping for each individual class will be different
  - Attempt to do genetic repair during genetic mapping.
    - I.e. No invalid phenotypes.

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## Tasks

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- Keep other subtasks of EA process simple (you'll have time mess with these in future CPs)
  - Use simple crossover / mutation
  - Use same crossover / mutation rates as in checkpoint 1.
  - Use same selection mechanisms as in checkpoint 1.
  - Keep fitness simple (even if evaluation isn't)

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## EA runs

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- For each individual class (genotype definition):
  - Run the EA for 100 generations.
  - Create a graph: generation vs. best fitness.
  - At end of run:
    - "print out" best individual (phenotype) with fitness.

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## Deliverables

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- Code
  - modification of framework (CP1) including code to support new individual classes
  - Instructions for building and running.
- Report
  - Descriptions / summary of work for checkpoint.

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## Coding tasks

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- Define data structures / operators for genotypes
- Define data structure for phenotype.
- Implement genetic mapping for each genotype/phenotype pair
  - Including genetic repair as needed.
- Produce "output" that will be judged for fitness.

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## Checkpoint report

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- Describe your phenotype
- For each individual class:
  - Describe your genotype
  - Describe (in words and/or pseudocode) the genetic mapping.
  - Describe any genetic repair done during mapping.
  - List best individual after all runs + fitness
  - Provide graph generated by the code.
- Compare the two individual classes in terms of solution fitness and convergence rate.

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## Questions?

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## Ground rules

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- To be done in your teams.
- Report submission in PDF, Word, or plain text.
- Code submission as zip, tar, etc.
  - Include instructions for building/running.
  - Include platform as mycourses comment when submitting.
- Electronic submission via mycourses.

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## Submission

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- Due Thursday, January 18th.
  - Note new date.
- Any trouble, see me sooner rather than later.

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