

Evolutionary Programming



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DNA Evolution

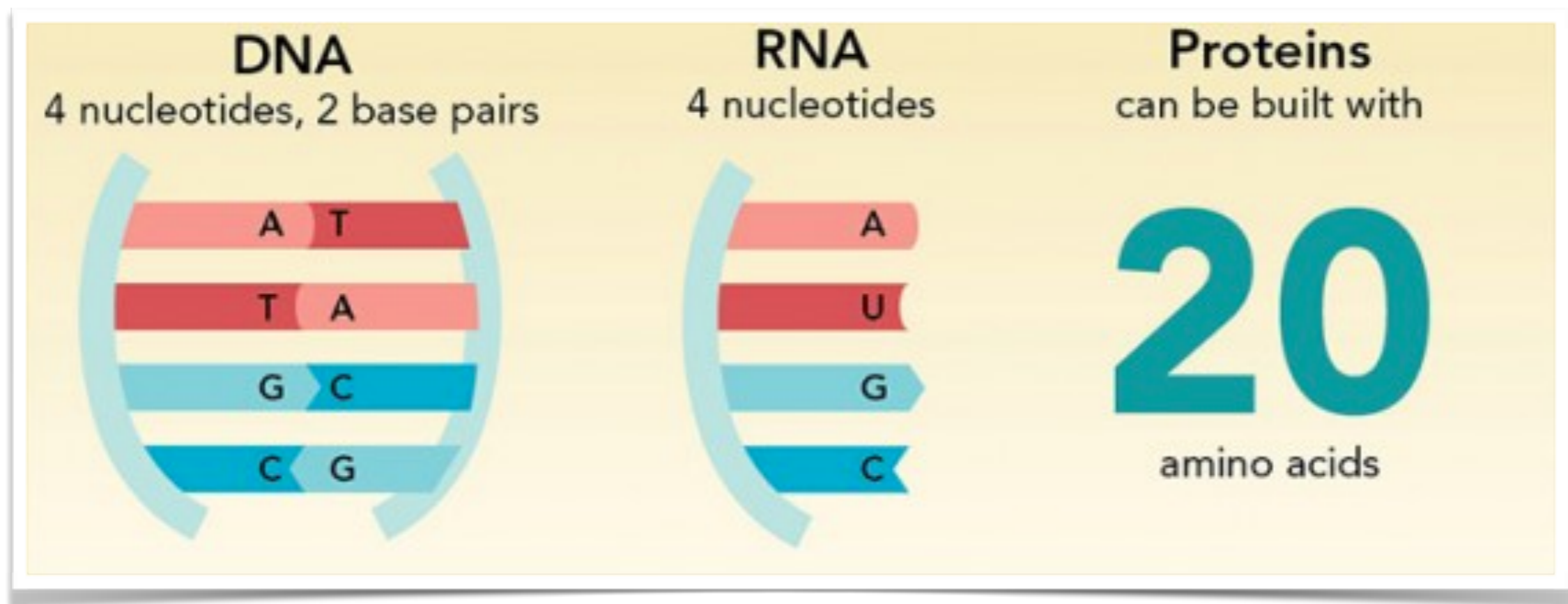
Intro

- All living creatures are representations of our **cell nuclei**, containing **DNA**. **DNA** can be translated into **RNA** then into **Amino Acids** to form **proteins** to maintain our daily activities.
- Sometimes a certain types of **proteins** or **amino acids** are needed to survive a crucial environment, which consequently needs for the creatures' genes to mutate.

Foundation

- **Nucleobases** are nitrogen-containing biological compounds—the basic building blocks of **DNA** and **RNA**.
- Three **nucleobases** may be translated into one type of **amino acid**.
- A series of nucleobases are needed for the adaptation to the new environment.

NUCLEOBASES



Main Purpose

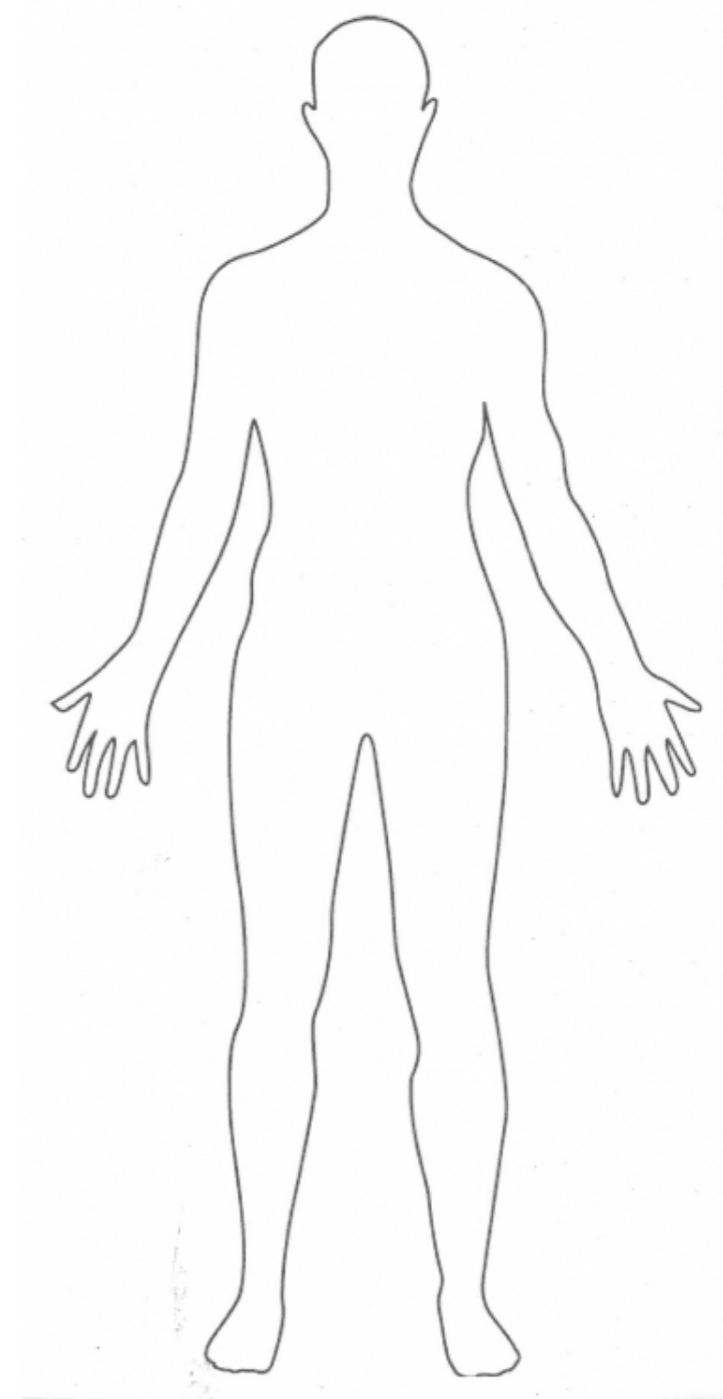
- The program is for biologists to examine and simulate the the nature of evolution in the genetic scope when the environment requires the creature produce a new type of protein, in other words, a new sequence of DNA.

Fitness

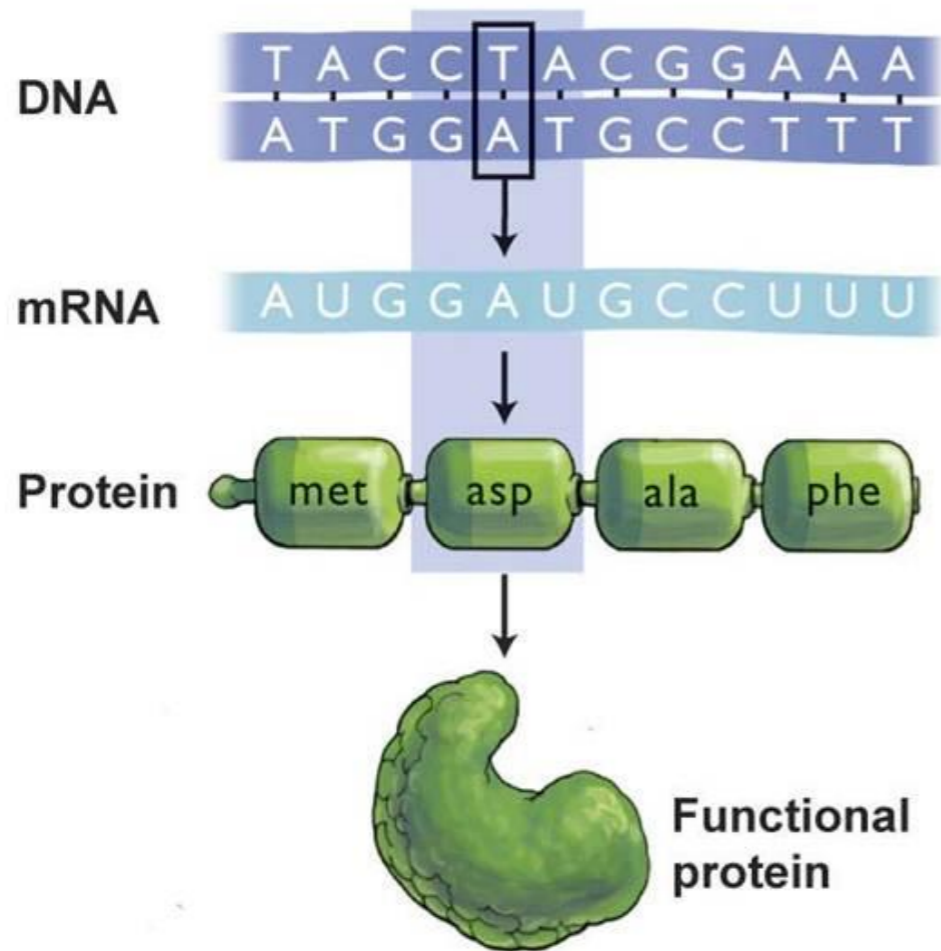
- **1** for creatures CONTAINING the DNA sequence at the certain location
- **0** for creatures WITHOUT the DNA sequence at the certain location

Individual

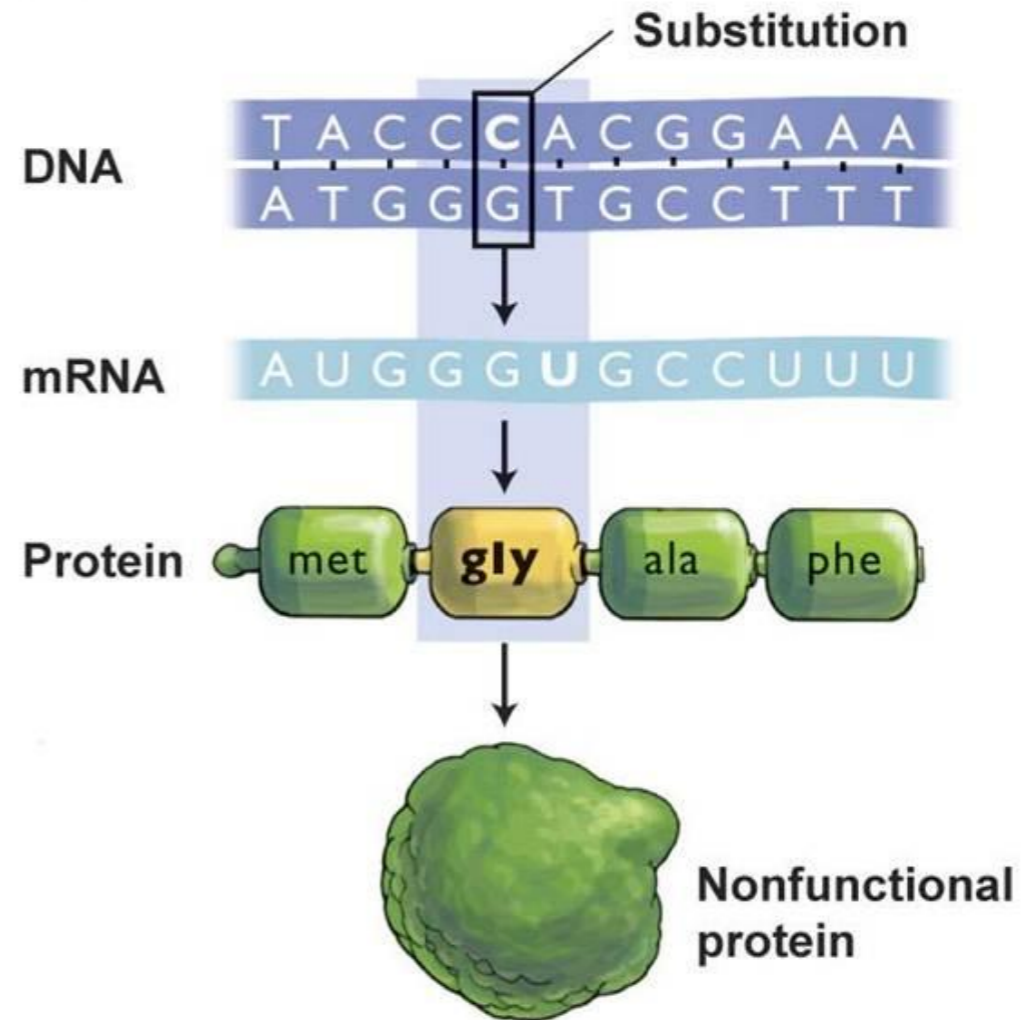
- DNA Sequence (TACG)
- Fitness (0~1)
- Individual number n



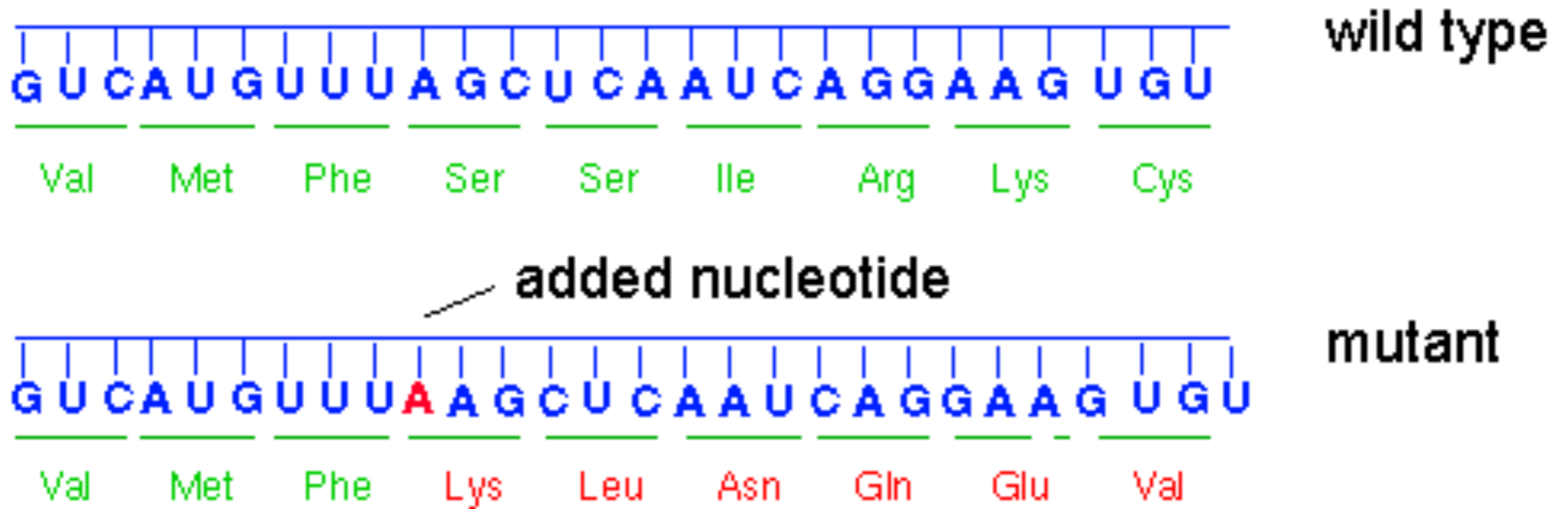
(a) Normal DNA sequence



(b) Missense mutation

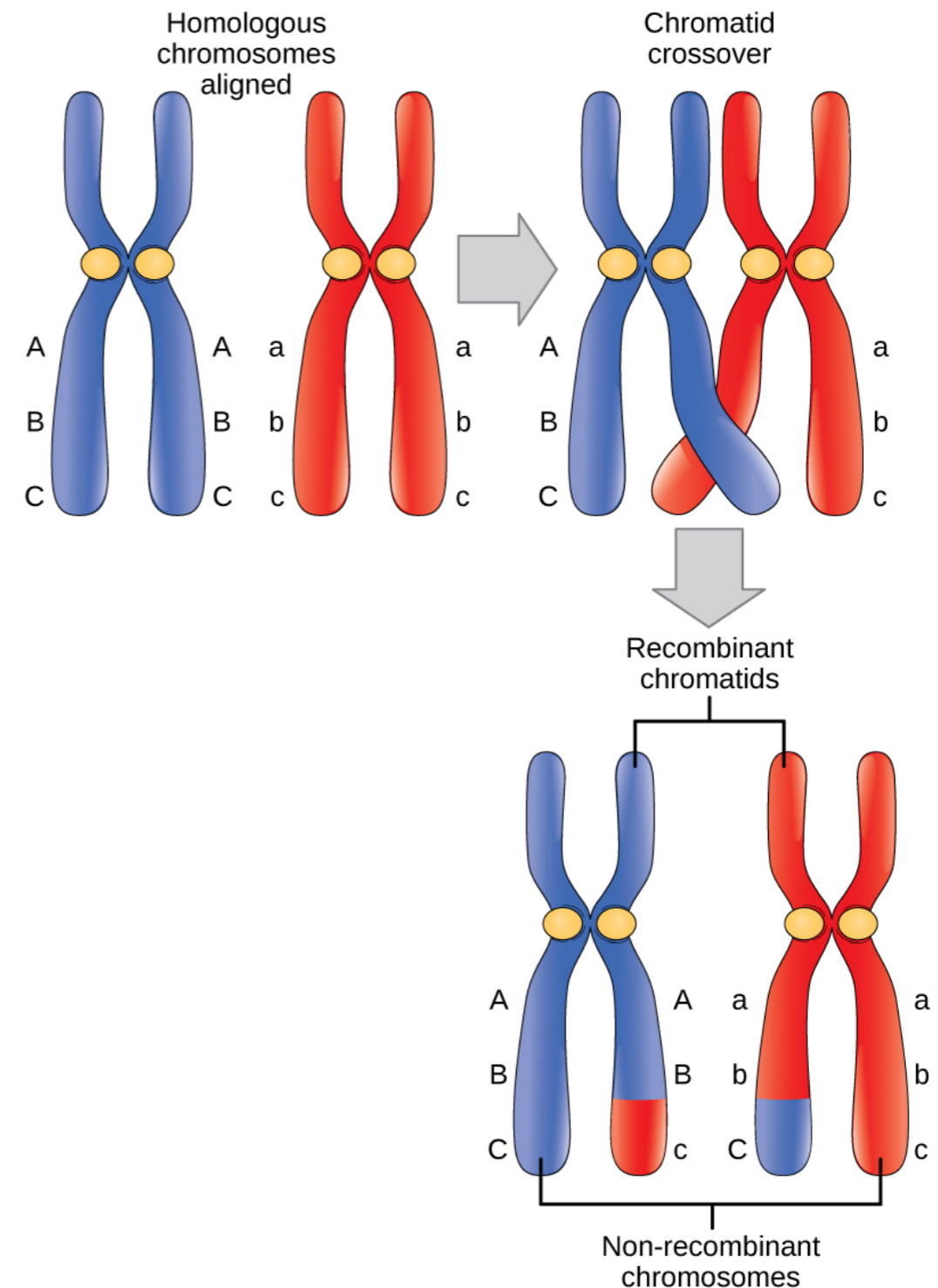


Point Mutation



Shift Mutation

Crossover



- Maintains the same functionality as the one in **RBG** project.

Demo? (Coming soon)