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Exercise 2

Search Based Software Engineering
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Task 1

a) What are $(1+1)$, $(1+\lambda)$, $(1,\lambda)$ and (μ,λ)?
They describe instances of evolutionary strategies.

b) Explain differences between them.

$(1+1)$: One parent produces one candidate solution and parent and child compete based on objective fitness for a position in the next generation.

$(1+\lambda)$: One parent produces λ candidate solutions and parent and children compete based on objective fitness for a position in the next generation.

$(1,\lambda)$: One parent produces λ candidate solutions and only the children compete based on objective fitness for a position in the next generation while the parent is disregarded.

(μ,λ): The μ fittest parents from randomly selected λ individuals from the population produce $\frac{\lambda}{\mu}$ candidate solutions each and these children form the new population.

Task 2

a) How does Line Recombination work? Explain in detail.

b) How can Line Recombination be extended to get Intermediate Line Recombination?

c) Implement Intermediate Line Recombination as a python function.

Task 3

a) What is Fitness-Proportionate Selection (FPS) and how does it work?

b) What is Stochastic Universal Sampling (SUS) and how does it work?

c) Implement SUS as a python function.