

## Check Points: Evolutionary Systems

If you are not able to answer some of these questions, first check the slides and book chapter. If you still do not understand the question, send an e-mail to the instructor.

- Describe the 4 pillars of evolution
- What is phenotype and genotype?
- Explain the components of biological DNA
- Describe the types of biological mutations
- Describe the main steps of a generation cycle in evolutionary computation
- Similarities and differences between natural and artificial evolution
- What is a discrete representation?
- Into what phenotypes a binary genotype can be mapped?
- Describe how to represent a real value with a binary representation
- Describe how to represent a job schedule with a binary representation
- Describe how to represent a sequence with a discrete representation
- What are real-valued representations and when may be used?
- Describe tree-based representations
- Describe the methods to create the initial population
- What is a fitness function?
- Describe proportionate selection
- When does proportionate selection fail and why?
- Describe rank-based selection
- Describe truncated rank-based selection
- Describe tournament selection
- What is elitism?
- Describe types of artificial crossover for different representations
- Describe types of artificial mutations for different representations
- What is the fitness landscape?
- How can we monitor performance of an evolutionary algorithm?
- Why is it important to monitor diversity?
- Is there an evolutionary algorithm that is best on any type of problem?
- How could we genetically encode an antenna design?
- What are the distinctive features of a Steady-State Genetic Algorithm?
- What are the distinctive features of Differential Evolution?
- What are the distinctive features of an Evolutionary Strategy?
- What are the distinctive features of CMA-ES?
- What are the distinctive features of Viability Evolution?