ARTIFICIAL INTELLIGENCE

Examination 25.10.2019

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1. Explain what the following terms mean:
   a) Artificial Intelligence (AI)
   b) Convolutional Neural Networks (CNN)
   c) Generative Adversarial Networks (GAN)

2. Using the Figure 1 (a) and (b) below:
   a) Describe the main ideas of Self-Organizing Maps (SOM) presented by Kohonen.
   b) Write down the main equations related to learning and recognition in SOM.
   c) What kind of applications are there for SOMs?

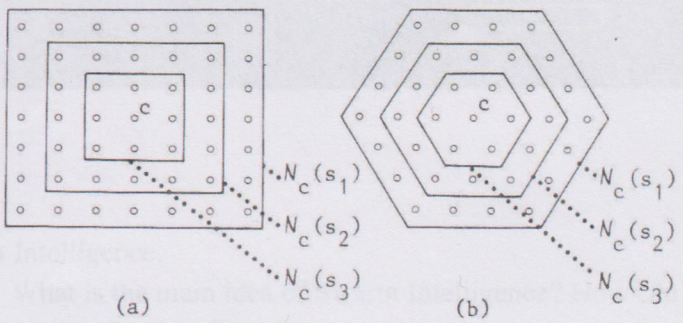
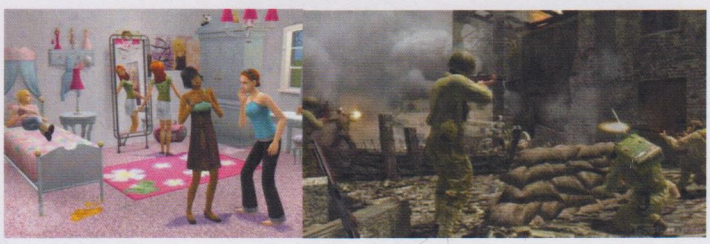


Figure 1.

3. a) What is the main idea of Genetic Algorithms (GA)? Explain the basic algorithm.
   b) What do recombination, mutation, and sex mean?
   c) What kind of applications are there for GAs? Give some examples. Can they be applied to computer games in any way?



CONTINUES →

4. Affective (or Emotional) Computing
    a) What is Affective (Emotional) Computing?
    b) What are the skills a system with Emotional Intelligence should have? How can the emotions be measured or calculated?
    c) What kind of applications are there for Affective Computing?

5. Swarm Intelligence.
    a) What is the main idea of Swarm Intelligence? How can it be realized artificially? Are there any applications?
    b) What are the 3 main rules of Boids ("Bird-oid" objects) in Swarm intelligence concerning their movement and positioning?
    c) Explain how the Traveling Salesman Problem (TSP) can be solved using the ideas of Swarm Intelligence (Ant Colony or Particle Swarm Optimization)?