Stamford University Bangladesh

MCSE 662: Evolutionary Algorithm

Summer 2022 Final Exam

Full Mark: 20×5=100 **Time: 2:30 Hours**

			Mark
1.	a	What are the basic properties of Evolutionary Algorithms (EAs)? Why EAs are preferable for engineering optimization tasks?	(7)
	b	What are the characteristics of Intelligence? Explain two characteristics related to EA and how these are adopted in individual EAs discussed in the course.	(7)
	c	Briefly explain intelligent characteristics of natural Bees those are mimicked to develop Artificial Bee Colony (ABC) Optimization?	(6)
2.	a	Define local search and global search? Does both search methods important in EAs? Justify your answer.	(7)
	b	Draw general flow chart of EAs and explain individual steps briefly.	(7)
	c	What do you mean by fitness function? Is it related to problem or algorithm? Justify your answer.	(6)
3.	a	What do you mean by constraint satisfaction problem (CSP)? What is the most popular/well-studied CSP? Explain its properties?	(7)
	b	Suppose two TSP solutions are 1-2-4-5-6-3 and 1-5-4-6-3-2 where numeric values are the city indexes. Generate an offspring from the solutions using Enhanced Edge Recombination method.	(7)
	c	What are the basic criteria/ways to stop an EA? Write Pros and Cons of each criterion.	(6)
4.	a	What are the basic conditions to consider Genetic Algorithm (GA) to solve an optimization task? Explain the conditional terms briefly.	(7)
	b	"In operation of a population-based method, a few bad solutions are not harmful; however, good solution(s) need to retain" – Justify the statement for GA.	(7)
	c	What do you mean blind search? Does GA hold blind search? Justify your answer.	(6)
5.	a	Define exploration and exploitation. Why both are important for optimization? How both are adopted/handled in Particle Swarm Optimization (PSO)?	(7)
	b	Explain transition probability matter in Ant Colony Optimization (ACO) with its equation.	(7)
	c	What do you mean by convergence? What is the significant characteristic of ACO regarding convergence? Explain briefly.	(6)

Bonus Question:

6.	a	What is the general structure of a standard research article? What will be contents under each individual sections?	(7)
	b	Write short notes on major sections of the article you studied/presented the course.	(7)
	c	Mention some probable applications in your service or experience where you may use knowledge of the EA course.	(6)