Comsats University Islamabad

Lab Mid Term Exam

Program	BCS 5 / BSE 6	**Semester**	FA21
Subject	Artificial Intelligence	**Subject Code**	CSC 462
Section	BCS V – BSE VI	**Instructor**	

Only upload .py/.ipynb and .pl file in portal.

Viva shall be taken in next lab. No viva shall result in zero grade even if code has been submitted.

Question 01: (15 marks)

Consider a problem where you are required to determine the optimal batting order for Pakistani cricket team. There are 11 players (and a few reserve players) in the team and we are provided with their batting averages at each position (batting order position). Before each match we create a batting order from the **selected 11 players**.

Pos/Player	BabarAzam	AsifAli	Fakhar Zaman	HaiderAli	Sohaib Maqsood	MRizwan	Sarfaraz Ahmed	…
Open	45	25	56	65	66	45	11	…
1-down	35	43	54	87	55	76	45	…
2-down	65	56	66	76	44	46	46	…
3-down	23	34	13	26	44	54	76	…
…	…	…	…	…	…	…	…	…

The goal is to find an ordered set of all the players for the cricket team such that the *average team score is maximized*.

Keep in mind that the last three positions (battling player 9, 10 and 11) do not affect the overall performance too much and are thus not considered.
Note:

1. For termination you can either set a certain limit to iterations (e.g. =300) or you can set any score (e.g. >300) as break point.
2. Create a 2D matrix containing all players and their batting averages. The columns can be the players and the rows can be batting positions.

Create a Genetic Algorithm solution for this optimization problem. You shall be marked on the following criteria:

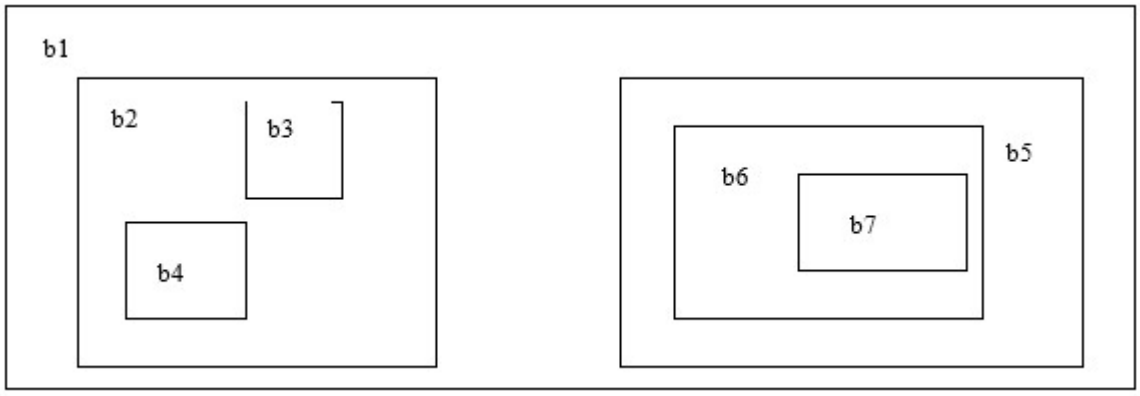
1. Representation of the problem (genes/chromosomes)
2. Creation of most suitable fitness function
3. Population regeneration and result finding

Question 02: (10 marks)

Given figure below write relevant **facts** and **rules.** You will need to write prolog code using facts (**contains)** and rule(s)(**encloses)**.

"**Encloses" Hint**: There will be two rules written to solve this problem…. Keep in mind the recursive case while writing these rules - that is true if its first argument encloses the second argument.

For example **encloses(b1,b6)** will **generate true.**



Save your file with your registration number e.g "FA20-BSE-007.pro" to be uploaded on MS Teams.
Due Date: 21st Nov, 2021 (by 11:55pm)
Late submissions will not be accepted.