Language course coordination – MAS scenario

Scenario description:

In Language Course Coordination (denoted as **LCC**) scenario, TCN agents coordinate among themselves to determine an optimal assignment of their TCNs into working groups. To do so, agents make use of individual, system constraints and course progress level of TCNs. Once grouping is done, agents propose the result to the course instructor (teacher). A mini-course which consists of 3 lessons will be conducted in the scenario.

Individual and system constraints are given below:

1) **Individual** constraints are specified by TCNs:

- **Gender**: A TCN is given the chance to specify with which gender he/she wants to be grouped. This constraint should always be considered as strict constraint when grouping.

- **Nationality**: A TCN is given the chance to specify whether he/she doesn't want to be grouped with other nationalities. The constraint will be taken into account as a preference rather than an exclusive constraint.

2) **System** constraints are given by language instructor.

- **Cardinality**: The number of TCNs in a group should be **at least 2** and **at most 5**.

- **Attendance**: In the case that a TCN missed the previous lesson, he/she should be included in a group where all the TCNs attended the previous class. If there are multiple TCNs who missed the previous lesson, then they should be distributed equally between groups.

- **Similarity**: Progress level of TCNs should be **similar intra-group** and dissimilar inter-group.

Course progress level (denoted as **CPL**) of a TCN represents TCN's language skill level over the course. It is the average of **lesson assessment scores** (denoted as **LAS**).   Each TCN will be asked to do assessment activities at the end of each lesson. The score of these assessment activities for a lesson is LAS. These assessment activites are **Reading**, **Writing**, **Grammar** and **Vocabulary** where each of them contains **multiple choice questions**. Each TCN will be asked to solve all types of assessment activities at the end of each lesson.

At the end of each lesson, LAS will be calculated and sent to respective agent by MyWelcome app. Assessment scores (denoted as **AS**) for Writing, Grammar and Vocabulary activities will be calculated based on the correct/incorrect answers. AS for Reading activity will be calculated based on 2 factors: 1) correct/incorrect answers and 2) the time that a TCN spends to complete the activity. Each assessment activity score will be on a scale between 0 and 100. A score in the interval of 0-49, 50-59, 60-69, 70-79, 80-89, 90-100 are considered *insufficient*, *sufficient*, *good*, *remarkable* and *outstanding* respectively. Furthermore, the time in the interval of 0-5, 5-10, 10+ minutes are considered as „*Student is doing OK*", „*Student is facing difficulties*" and „*Student is struggling*" respectively.

LAS = 0.25*Reading_AS + 0.25*Writing_AS + 0.25*Grammar_AS + 0.25*Vocabulary_AS

"Activity"_AS means Activity Assessment Score where Activity can be Reading, Writing, Grammar and Vocabulary.

CPL = (LAS_1 + . . . + LAS_n)/n

To satisfy the similarity system constraint, agents will **only make use of the CPL** of TCNs such that the TCNs who are members of the same group have similar CPL. CPL will be taken into account starting from second lesson since the first assessment will be conducted at the end of first lesson. Grouping for first lesson will be based on all constraints except similarity.

Between 2 consecutive lessons, there will be 1 and 7 days for worst and best case scenarios respectively. Therefore, agents need to deliver grouping results to teacher in around one day.