This semester’s project involves developing a program to simulate collective sports. The three projects correspond to three different sports:

**Project 1:** Football

**Project 2:** Volleyball

**Project 3:** Cycling

All these sports are played by teams, composed by players (for the sake of simplicity we will also denote the cyclists as players). In the case of football and volleyball, a game must be simulated, and the winner team will be the one scoring respectively more goals or more points. In the case of cycling, a stage from a race composed by stages must be simulated, and the winner will be the team to which the first cyclist crossing the finish belongs.

Besides, the program will have to:

- Manage the creation of teams and players.
- Manage the creation of games (football and volleyball) and stages (cycling).
- Allow that one of the teams playing is the own program.
- Control that the game’s rules are applied correctly.
- Allow to save the game or the stage in order to continue playing any other time.
- Maintain a ranking system and a record list.

Besides the quality factors of any program (design, coding, efficiency, reusability, modifiability, usability, documentation,...), at least two automatic play strategies must be implemented, which would allow the possibility of a machine playing against another one if desired.

Each player is defined by certain predefined features (speed, jump ability, climber,...) and by how good it is at each of these features ("very/average/poor" or maybe in a numerical scale). In principle, the behaviour of the players can be determined only by their own features and the situation of the game/stage at that moment, although we will highly value the existence of global strategies at team level (that is, where the figure of the coach makes sense).

In order to make the simulation a little bit more realistic, take into account that:

- Any sport has a strong component of chance. Some examples: not always the best striker scores a goal when shooting, not even if the goalkeeper in front is the worst of the world (in fact, many times he shoots out); the trajectory of a volleyball ball cannot be completely controlled; the best climber can suffer a physical breakdown when climbing the Tourmalet (although he may later on physically recover on the way down), etc.
- The players’ resources are limited. Some examples: a football or volleyball player cannot be running or jumping all the game long; a cyclist cannot be sprinting for too long; after a strong climb, a recovery time is needed; the energy that can be spent in a game or stage is limited, etc.

**Submission dates:**

- First: Friday, October 8\textsuperscript{th}
- Second: Friday, November 19\textsuperscript{th} (specification of shared classes: November 5\textsuperscript{th}; acceptance of shared classes: December 10\textsuperscript{th})
- Third: Monday, December 20\textsuperscript{th} (interviews: starting from January 10\textsuperscript{th})