

EXERCISE 1

Model a BPMN collaboration showing a **cab booking process** among a **cab firm**, **taxi drivers** and **customers**. The collaboration starts any time a new customer contacts the cab firm to book a taxi in order to reach a destination. Once the cab firm receives the message queries the database until it finds an available taxi driver. Then, the firm communicates the ride to the selected driver that can accept or not. Depending on its decision, the driver updates its availability and reaches the customer position. Once he/she has been picked up, the customer provides the destination to the driver, and then pays the ride. Finally, the driver becomes available again.

EXERCISE 2

Model a BPMN collaboration representing a wireless sensor network for a smart home heating system. The system is composed by a user interacting with the thermostat, a controller, 3 temperature sensors and the boiler. The collaboration can start once the user switches on the thermostat and sets the desired temperature. Then, the thermostat delegates to the controller to manage the boiler; and waits for the current ambient temperature. The controller activates the sensors which start to communicate non-stop the sensed temperature. These values are used by the controller to calculate the average and decide if to turn on the boiler. The boiler itself decides if to fire the burner depending on the maximum water temperature.

EXERCISE 3

Model a BPMN collaboration in which is depicted the Unicam internship procedure. The actors of this process are the Students, the Internship Office, the Internship Delegate and the Companies. Each Company can interact with the Internship Office by registering or logging in the online platform. After that, the Company can update an internship proposal and waits for a student agreement. Students that want to join an internship must have at least 180 ECTS, this allows them to attend the occupational safety course. Then, each student chooses one of the available internships communicating it to the Company. Now, the Company sends the required documentation to the Internship Delegate that assigns a Tutor to check and register the completion of the project. Finally, the Student receives the award and the collaboration completes.

EXERCISE 4

Model a BPMN collaboration depicting a blockchain framework in which are performed several transactions. Each User can create a transaction and send it to the System Management that checks its validity. If the transaction is correct, it becomes available for the Miners. The Miners retrieve a fixed number of transactions in order to create a block and mine its hash-code. (The mining consists in generating a random 3 digits number until it becomes a multiple of 100) Once a Miner gets the correct hash adds it both with the block in the blockchain and sends it to the Consensus Network, then he waits the reward from the System Management. The Consensus Network applies the Byzantine's protocol to validate and eventually to update the blockchain and contact the System Management for the Miner's reward.