Objektorientierte Analyse & Design
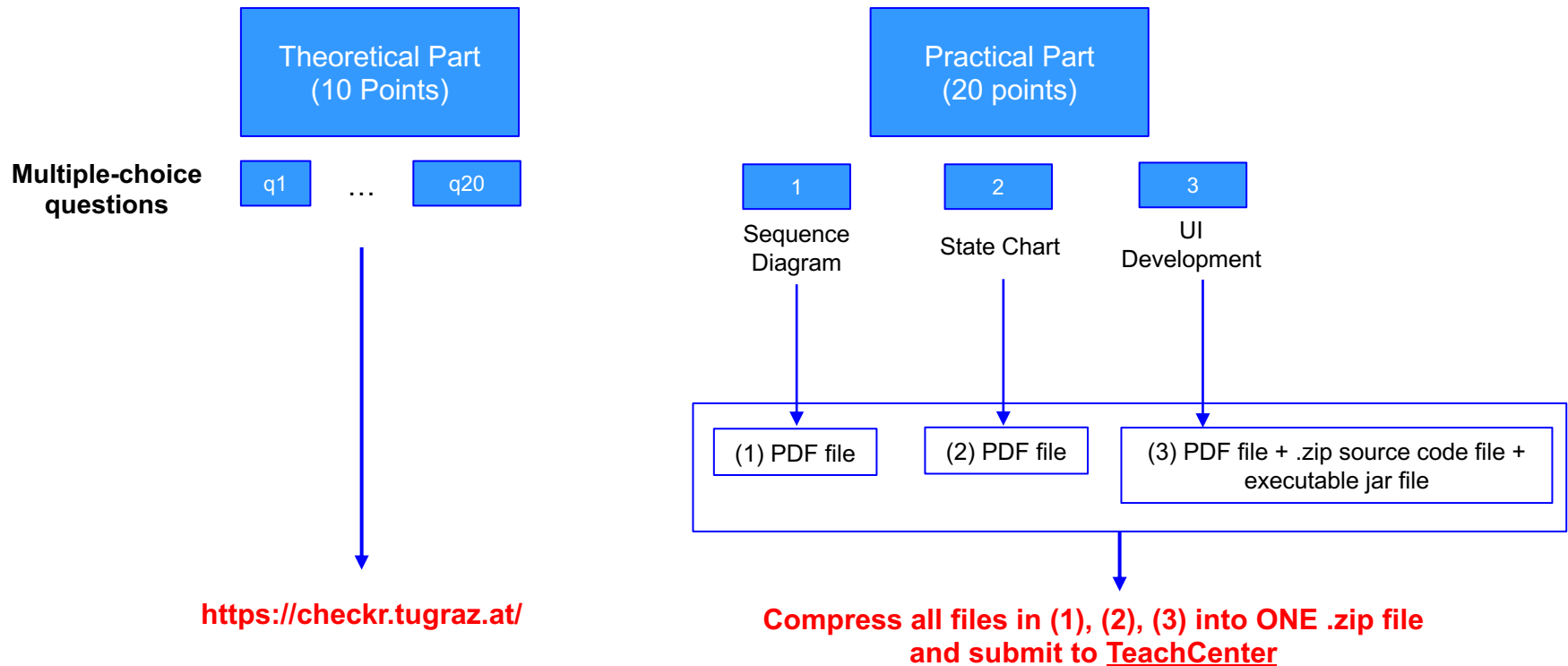## - Übungsblatt 2 -
- Exercise 2 -

The structure of Exercise 2

Theoretical Part
(10 Points)

Practical Part
(20 points)

Multiple-choice questions

q1 … q20

1
Sequence Diagram

2
State Chart

3
UI Development

(1) PDF file

(2) PDF file

(3) PDF file + .zip source code file + executable jar file

https://checkr.tugraz.at/

Compress all files in (1), (2), (3) into ONE .zip file and submit to TeachCenter

Exercise 2 (Theoretical Part = 10 Points)

- Visit https://checkr.tugraz.at

- Register with your **TUGRAZ student mail address** (**important**)!

- At https://checkr.tugraz.at/, enter the key **wCRGuG**

- Provide your answers to the posed questions (several tries are possible!)

- The questions have to be answered individually

- If all questions have been answered correctly, this corresponds to **10 points**

- **No** submission is needed for the theoretical part!

Exercise 2 (Practical Part 1 = 6 Points)

Create a sequence diagram (using Visual Paradigm) to model the "***Return a book***" functionality of a Library Management System. A student (who has a library card) interacts with the system to proceed with the "book return" according to the following steps:

Step 1: The student scans his/her library card through the barcode reader. The card information is sent to the system to be verified. If the card is invalid, then an alert is shown to ask the student to scan another card. Otherwise, the user goes to step 2.

Step 2: The student activates the return book functionality.

Step 3: The student enters the barcode of the book.

Step 4: The system fetches the details of the book.

Step 5: The system checks if the book is being returned within the due date.

• If yes, then the system goes to *Step 6*.

• Otherwise, the system activates a fine transaction, calculates the fine cost, informs the student about the fine cost, and thereafter goes to *Step 6*.

Step 6: The system decreases the number of books issued to the student.

Step 7: The system checks if the book has been reserved by any other students?

• If yes, then the system updates the book status to "Reserved", sends a notification to the student (who has reserved the book before) about the availability of the book, and thereafter moves to *Step 8.*

• Otherwise, the system updates the book status to "Available" and goes to *Step 8*.

Step 8: The system informs the student about the successful book return and asks him/her to put the book into the box next to the entrance of the library.

Step 9: Optionally, the system sends the student a confirmation email if he has selected the option "Send the confirmation via email".

<u>Notes</u>:

• If you think any information in the description is missing (e.g., further specifications are need), then you should make your own assumptions and document them correspondingly.

• Create a PDF file where the created sequence diagram and further information (if needed) are included.

Exercise 2 (Practical Part 2 = 6 Points)

Create a state chart (using Visual Paradigm) to model the "Check-out" functionality of a Parking-lot Management System. This functionality is performed as follows:

Initially, the customer inserts the parking ticket in the exit panel (we assume when entering the parking lot, the customer was provided with a parking ticket). The system scans the parking ticket and checks if the ticket has been paid. If yes, then the system sends the signal to open the parking gate, and the procedure is completed (i.e., goes to the final state).

If the ticket has not been paid yet, then the system calculates the total parking fee, shows it on the display panel, and asks for the customer's credit card details. The customer inserts the credit card into the card reader. The system reads the card details to proceed with the payment.

If the payment with the credit card is failed, then the system shows an error message and asks the customer to make the payment again. Otherwise, the system shows a message to ask if the customer wants to print the receipt (printing the receipt is optional). After that, the system sends the signal to open the parking gate, and the procedure terminates.

Notes:

- If you think any information in the description is missing (e.g., further specifications are need), then you should make your own assumptions and document them correspondingly.

- Prepare a PDF file where the created state chart and further information (if needed) are included.

Exercise 2 (Practical Part 3 = 8 Points)

Assume you are developing an Employee Management System to support employees (in the Human Resource Department) to manage the information of the employees of a company. Use **Model View Control architecture** to design and implement a prototype (using Java Swing) that offers the following functionalities:

• Show the list of employees with the following information: *First name, last name, ID number, gender, date of birth, email, phone,* and *address*.

• Add a new employee to the list.

• Edit the information of an employee from the list.

<u>Notes</u>:

• Include a state chart representation of the controller implementation.

• The information of employees is NOT necessarily saved in the database.

• If you think any information in the description is missing (e.g., further specifications are need), then you should make your own assumptions and document them correspondingly.

• Prepare a PDF file (maximum 3 pages) including all user interfaces and further explanation of the design and implementation of the prototype.

• Prepare a zip file (including the source code) and an executable jar file.

Submission of Exercise 2

- **Theoretical part**: NO submission needed (the points are calculated from the share of your correct answers in https://checkr.tugraz.at/.

- **Practical part**: Submit one integrated .zip file to TeachCenter that includes the solutions to the practical part.

- **Deadline (strict) for Exercise 2: 14:00, 15.05.2021**

Thank You!

In case of questions, please
contact the newsgroup: tu-graz.lv.oad