



INF2C SOFTWARE ENGINEERING 2019-20 COURSEWORK 1

Capturing requirements for a federalised bike rental system

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Description:

- producing a requirements document for a simplified computer system for managing a bike rental system.

Q3.1 Stakeholders:

(1) Core stakeholders:

- Locals: The local citizens who want to use bikes to travel around different sights in Scotland and they can easily use the rental system to find the suitable kind of bike.
- Tourists: Visitors can use the system to have a better knowing of the city and they can easily meet their best needs.
- Bike shops: The providers of rental bikes. The rental system will utilize them to offer customers wide variety of types of bikes. Shops might gain benefits (daily rental money) from system users.
- Bike producers: Bike producers would make more variety of types of bikes (e.g. road bikes, mountain bikes, hybrid bikes, ebikes, etc.) in order to meet the needs of the bike shops.

(2) Additional stakeholders:

- Scottish tourism board: The proposer of the rental system. This system is willing to boost tourism and protect the environment due to allowing customers to cycle instead of drive.
- Investors: Investors could gain profits from the rental system which they invested.
- Government: Government would support the system to encourage and help the development of the city. Also, the system may elevate the cycling awareness of public which is the aim that the government would like to see.
- Local police: Police would increase the manpower to maintain the traffic safety in order to prevent the bad traffic consequence caused by the increasing bikes.
- Public transportation: Public transportation might lose some amount of proportion of customers due to the launch of system.
- Local media: Media might report the news of the system.

Q3.2 System state:

● User mode:

1. Receiving request: Getting information from customers, like number and types of bikes, date range, location of hire.
2. Collection of quotes: Collecting a list of quotes from providers who can offer the bike in during time, which include total price and deposit.
Additional state: If no quotes is available, system will suggest other quotes.
3. Personal information: The system will receive the information provided by the customer.

4. Payment: After payment, a confirmation is generated which includes the order unique number, total price, deposit, delivery and return information.
 5. Return deposit: Deposit will be returned after return the bike.
- Provider mode:
 1. Register system: Providers can register the system by giving information (their name, shop address, shop postcode, phone number and opening hours.) of the shops and their selves.

Additional state: Providers can also make partnership agreements with other providers. These partnerships can be registered in the system by indicating both of the providers entering into a partnership.
 2. Change bike information: The provider can add and change the bike information.

Additional state: Provider must set daily rental price for each type of bike included in its stock or it will be a failure.
 3. Register the deposit: After the customer pick a bike, the provider registers the deposit and updates the bike status.

Additional state: Delivery driver can also register the deposit and updates the bike status.
 4. Return the deposit: After the customer return the bike, the provider returns the deposit and updates the bike status.

Additional state: If customer return bike to partner, partner return the deposits.

Q3.3 Use cases:

1. Rent bikes:
 - Primary actor: User
 - Secondary actor: Provider
 - Summary: Users choose and book a preferred bike after looking through the quotes provided by the providers.
 - Precondition: Users need to provide information on their rental needs.
 - Trigger: Users successfully book their preferred bike.
 - Guarantees:
 - i) Success guarantees: All users would book the preferred bike.
 - ii) Failure guarantees: After the system find other quotes, there are still none quotes exist. Hence the users do not book any bikes.
 - iii) Minimal guarantees: Users find a bike.
 - Main Success Scenario:
 1. Users upload their rental requirements on system.
 2. System show enough quotes from different providers for user.
 3. Users choose one of suited quote.
 4. Users upload their personal information.
 5. Users decide the way of bike collection.
 6. System jumps to payment program when user book the bike successfully.
 - Extension:

1. If no quotes is available, system will suggest other quotes.
2. Users can pick up from bike shop or deliver.

2. Pay deposit & rent price:

- Primary actor: User
- Summary: Users pay after choosing the quote.
- Precondition:
- Trigger: Users successfully pay the rent of their preferred bike.
- Guarantees:
 - i) Success guarantees: Users successfully pay the deposit and the rental fee without any problems.
 - ii) Failure guarantees: Fail to pay.
 - iii) Minimal guarantees: Users successfully pay the deposit and the rental fee.
- Main Success Scenario:
 1. user pay the rent and deposit online.
 2. System generate a confirmation about rental bike, including the order number, order summary, deposit, total price, delivery and return information.
 3. System stop providing any quotes about booked bike on the required dates.
- Extension:

No extension, we assume that all users will pay deposit on time.

3. Return deposit:

- Primary actor: Provider
- Summary: Provider should return the deposit to the users after they returned the bike.
- Trigger: Provider successfully return the deposit to the users.
- Guarantees:
 - i) Success guarantees: Provider successfully return the deposit to the users.
 - ii) Failure guarantees: Provider do not return the deposit to the users.
- Extension:

No extension, we assume that all providers will return deposit to users on time.

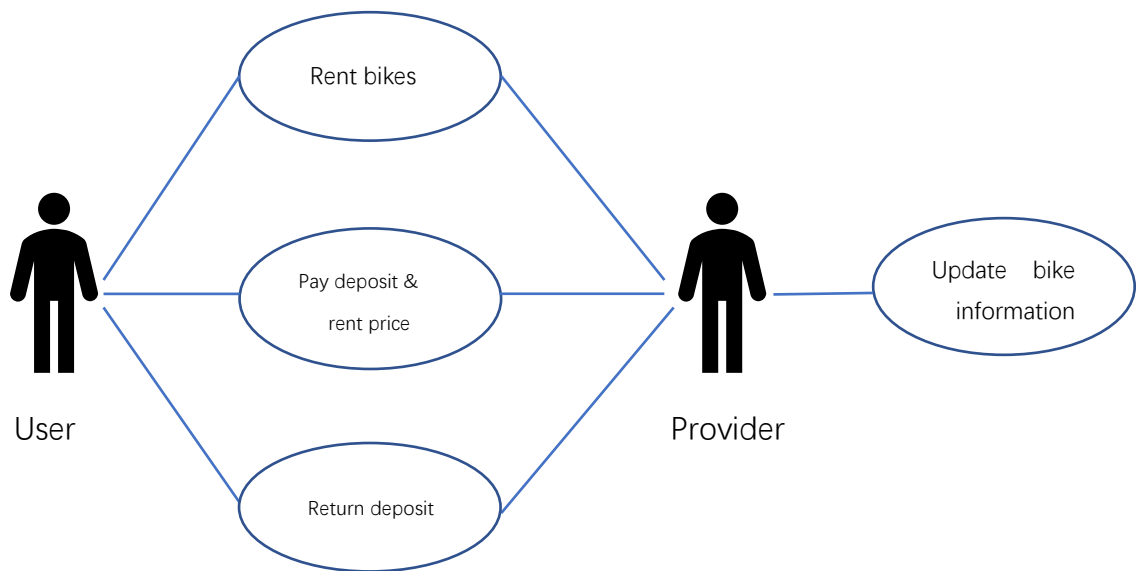
4. Update bike information:

- Primary actor: Providers
- Summary: In order to register the system, essential information is given by the provider. After registered the system, providers can change information of bikes such as bike states.
- Trigger: Providers successfully register the system and successfully change the information as they wish to.
- Main Success Scenario:

providers upload their information on the database of system.
- Extension:
 1. Providers can also make partnership agreements with other providers.

2. Provider must set daily rental price for each type of bike included in its stock or it will be a failure.

Q3.4 Use case diagram:



Q3.5 Non-functional requirements:

- Security:
 1. Verification: This system should check the identity of the user and the provider.
 2. Protection: The system should be able to resist the attacks from any computer virus, in order to protect the personal information and payment process.
 3. Authorization: All transaction should be authorized and confirmed.
- Performance:
 1. Response time: Any operation of user should be responded within 1 second.
 2. System dependability: The system should not stop working unless user loses the signal of the internet. If that happens, the user should be informed.
 3. Showing information directly: User could look through quotes directly without any interference information.
- Quality:
 1. Updateability: This system could update when other requirements occur.
 2. Resource required: This system should be efficient and use as less memory as possible.
- Usability:
 1. Simple and convenient operation: The user who use this system for the first time should get familiar with each step clearly and quickly.
 2. Different version: the system should provide different language versions for user who come from different countries.

- Platform Compatibility:
 1. Screen resolution: This system should fit different screen size of wide range of devices from computer to smartphone.
 2. Operating system compatibility: This system could download on any operating system, like Microsoft or MacOS.
- Data Retention:
 1. Information reservation: all of information about users, providers and their bikes will upload and reserve in the system database. When user want to change the any detail, the database would be renewed immediately.
- Reliability:
 1. Payment service: The system should accept most mainstream card types.
 2. Easy recovery: When the internet disconnects, the detail that user did not save would upload automatically. After reconnecting, user could use or change previous information.
- Safety:
 1. This system will not affect the use of other software.
 2. It does not cause any bugs to the devices.

Q3.6 Ambiguities and subtleties:

- Specific payment method:
The system should specify some payment method to let users to pay rent.
- Return deposit method:
The system should specify a return method to let providers to return deposit.
- Searching quotes:
The system should provide some algorithms in order to run keyword searching.

Q3.7 Self-assessment:

- Q 3.1 Identify stakeholders 15%/15%
 - Identify core stakeholders of the system 5%/5%
 - Identify additional stakeholders 5%/5%
 - Describe how the system affects each stakeholder 5%/5%
- Q 3.2 Describe system state 10%/8%
 - Include state essential to the operation of the system 5%/3%
 - Include additional state mentioned in the description 5%/5%
- Q 3.3 Describe use cases 40%/35%
 - Identify use cases 10%/10%
 - Describe use cases using the appropriate templates 30%/25%
- Q 3.4 Use case diagram 15%/15%

- Correctly use UML use case notation 5%/5%
- Include key actors and use cases 5%/5%
- Identify connections between actors and use cases 5%/5%
- Q 3.5 Describe non-functional requirements 10%/10%
 - Identify non-functional requirements within the context of the system 7%/7%
 - Provide means for assessing non-functional requirements 3%/3%
- Q 3.6 Ambiguities and subtleties 5%/4%
 - Identify some ambiguities in system description 3%/2%
 - Discuss potential options for resolution of ambiguities 2%