!Standard Mode: off

!List Exceptions:

{NETWORK_EXCEPTION::UnableToConnectToBank},

{HARDWARE_EXCEPTION::BikeDockBroken},

{ENVIRONMENT_EXCEPTION::CarCrash}

Use Case: BecomeMember

Scope: BIXI_System

Level: USER_GOAL

Intention: "The intention of the BIXI User is to subscribe to a BIXI membership in order to take advantage

of unlimited bike rentals for an extended period of time."

Multiplicity: "Multiple BIXI Users can become members simultaneously. A given BIXI User can only become a member

once."

Primary Actor: HUMAN::BIXIUser

Secondary Actor: SOFTWARE::CreditCardCompany, SOFTWARE::KeyDistributor

Main Success Scenario:

1. "BIXIUser informs System whether she wants to subscribe to a 30-day membership or a 1-year membership, also

providing address and user account details."

2. "System informs BIXIUser about the user contract."

3. "BIXIUser notifies System that she accepts the contract."

4. "System prompts BIXIUser for credit card details."

5. "BIXIUser informs System about credit card details."

6. "System contacts CreditCardCompany to verify card validity and charge the membership fee."

7. "CreditCardCompany confirms card validity and transaction to System."

8. "System informs BIXIUser about the successful membership subscription."

9. "System notifies KeyDistributor to send a BIXI key to the address of the BIXIUser."

use case ends in: SUCCESS

Extensions:

exception for 1:

1a.{HARDWARE_EXCEPTION::BikeDockBroken} #Bike dock is out of order#

Use case ends in: FAILURE

exception for (1-9):

(1-9)a.{ENVIRONMENT_EXCEPTION::CarCrash}#Car crashes into system#

Use case ends in: FAILURE

alternative for (2-5):

(2-5)a. "BIXIUser informs System that she wants to cancel registration process."

Use case ends in: ABANDONED

exception for 6:

6a.{NETWORK_EXCEPTION::UnableToConnectToBank} #Bank cannot be contacted#

use case ends in: FAILURE

alternative for 7:

7a. "CreditCardCompany informs System that there is a problem with the credit card."

7a.1. "System notifies BIXIUser that there is a problem with the credit card."

Use case continues at step: 4

Use Case: RentBike

Scope: BIXI_System

Level: USER_GOAL

Intention: "The intention of the BIXI User is to borrow a bike to ride it from one BIXI station to another BIXI station."

Multiplicity: "Multiple BIXI Users can rent bikes simultaneously. A given BIXI User can rent up to 4 bikes simultaneously."

Primary Actor: HUMAN::BIXIUser

Main Success Scenario:

1. "BIXIUser takes an available bike from a System station."

2. "BIXIUser rides the bike to another System station."

3. "BIXIUser returns the bike at a System station."

use case ends in: SUCCESS

Extensions:

alternative for 2:

2a. "BIXIUser was not able to take out a System bike."

Use case ends in: FAILURE

Use Case: TakeBikeShortTerm

Scope: BIXI_System

Level: SUB_FUNCTION

Intention: "The intention of the BIXI User is to take advantage of the short term rental deals."

Multiplicity: "Multiple BIXI Users can take bikes out with short term contracts simultaneously. A given BIXI User

must take bikes out sequentially."

Primary Actor: HUMAN::BIXIUser

Secondary Actor: READER::CreditCardReader, SOFTWARE::CreditCardCompany, PHYSICAL_ENTITY::BikeDock

Precondition: "There is at least one functioning bike at the BIXI station."

Main Success Scenario:

1. "BIXIUser informs System whether she wants to do a one-way trip, a 1-day rental or 3-day rental."

2. "System informs BIXIUser about the user contract."

3. "BIXIUser notifies System that she accepts the contract."

4. "System prompts BIXIUser to insert her credit card."

5. "CreditCardReader informs System about credit card details."

6. "System contacts CreditCardCompany to verify card validity, charge the appropriate fee, and take a security deposit,

if needed."

7. "CreditCardCompany confirms card validity and transaction to System."

8. "System provides unlock code to BIXIUser."

"BIXIUser finds a docked bike she would like to rent, and enters unlock code at the corresponding bike dock."

9. "BikeDock communicates unlock code to System."

10. "System instructs BikeDock to unlock the bike."

use case ends in: SUCCESS

Extensions:

alternative for 1:

1a. "BIXIUser informs System that she already has a 1-day or 3-day contract."

Use case continues at step: 4

alternative for 1:

1b. "BIXIUser wants to use their already existing short term contract, but it has expired in the System."

1b.1. "System notifies BIXIUser that their previous short term contract has expired."

Use case ends in: FAILURE

alternative for (2-5):

(2-5)a. "BIXIUser informs System that she wishes to cancel."

Use case ends in: ABANDONED

alternative for 7:

7a. "CreditCardCompany informs System that there is a problem with the credit card."

7a.1. "System notifies BIXIUser that there is a problem with the credit card."

Use case continues at step: 4

Use Case: TakeBikeMember

Scope: BIXI_System

Level: SUB_FUNCTION

Intention: "The intention of the BIXI User is to take advantage of his membership to take out a bike."

Multiplicity: "Multiple BIXI Users can take bikes out with their membership contract simultaneously. A given BIXI

User can only take out one bike at a time."

Primary Actor: HUMAN::BIXIUser

Secondary Actor: PHYSICAL_ENTITY::BikeDock, SOFTWARE::CreditCardCompany

Precondition: "BIXIUser has a membership, has received his BIXI key, and there is at least one functioning bike at the

BIXI station."

Main Success Scenario:

"BIXIUser walks up to a bike dock with a bike she wants to rent, and inserts her BIXI key into the bike dock's key

reader."

1. "BikeDock notifies System that a member wants to take out a bike."

2. "System contacts CreditCardCompany to verify card validity and take a security deposit, if needed."

3. "CreditCardCompany confirms card validity and deposit, if any, to System."

4. "System instructs BikeDock to release the bike."

use case ends in: SUCCESS

Extensions:

alternative for 2:

2a. "System determines that the BIXIUser's membership has expired."

2a.1. "System notifies BIXIUser that there is a problem."

Use case ends in: FAILURE

alternative for 3:

3a. "CreditCardCompany informs System that there is a problem with the credit card."

3a.1. "System notifies BIXIUser that there is a problem."

Use case ends in: FAILURE

Use Case: ReturnBike

Scope: BIXI_System

Level: SUB_FUNCTION

Intention: "The intention of the BIXI User is to return her bike at a BIXI station."

Multiplicity: "Multiple BIXI Users can return bikes simultaneously. A given BIXI User can return multiple bikes at a

time."

Primary Actor: HUMAN::BIXIUser

Secondary Actor: PHYSICAL_ENTITY::BikeDock, READER::CreditCardReader

Precondition: "There is at least one empty bike dock at the BIXI station."

Main Success Scenario:

"BIXIUser rides his bike to a BIXI station, and finds an available bike dock."

1. "BikeDock notifies System about the bike that has been returned."

2. "System instructs BikeDock to lock the bike, thus notifying BIXI User that the return was successful."

3. "System contacts CreditCardCompany to charge for the trip, if needed, and to release the security deposit,

if the BIXIUser is currently not renting any other bikes."

use case ends in: SUCCESS

Extensions:

alternative for 1:

1a. "There are no available spots at the BikeDock for the System bike."

1a.1. "BIXIUser requests additional time from System so that she can ride the bike to a different station."

1a.2. "System asks BIXIUser for identification."

"BIXIUser inserts credit card into Credit Card Reader."

1a.3. "CreditCardReader informs System about credit card details."

1a.3.1. "BIXIUser is a long term System member."

1a.3.2. "BIXIUser communicates her BIXI key number to System."

1a.4. "System acknowledges request to BIXIUser."

Use case continues at step: 1

alternative for 1:

1b. "There are no available spots at the BikeDock for the System bike."

1b.1. "BIXIUser requests dock availability information for the neighbouring stations from System."

1b.2. "System provides dock availability information to BIXIUser."

Use case continues at step:1

Use Case: EnsureBikeSafety

Scope: BIXI_System

Level: USER_GOAL

Intention: "The intention of the City of Montreal is to make sure all BIXI bikes are safe to ride."

Multiplicity: "Multiple Ensure Bike Safety scenarios can be active at a given time."

Primary Actor: HUMAN::CityofMontreal

Facilitator Actor: PHYSICAL_ENTITY::BikeDock

Secondary Actor: PHYSICAL_ENTITY::BikeDock, HUMAN::ServicePerson

Main Success Scenario:

"BIXIUser discovers that a bike has a defect and needs repair, returns it to a bike dock and presses the “needs repair”

button."

1. "BikeDock notifies System about the bike that has to be serviced."

2. "System notifies the most appropriate* ServicePerson about the bike that needs repair."

3. "ServicePerson acknowledges task to System."

"ServicePerson drives to BIXI station and inserts his service key into the appropriate BikeDock."

4. "BikeDock informs System that ServicePerson is on site and wants to remove the bike."

5. "System requests BikeDock to unlock the bike."

"ServicePerson repairs the bike on site and returns it to an available BikeDock."

6. "BikeDock informs System that the bike is functional again."

7. "ServicePerson informs System that his task is done."

use case ends in: SUCCESS

Extensions:

alternative for 6:

6a. "ServicePerson can’t repair the System bike on site."

6a.1. "ServicePerson informs System that he is going to take the bike to the central BIXI repair site and that his task

is done."

Use case ends in: SUCCESS

Use Case: EnsureBikeAvailability

Scope: BIXI_System

Level: SUB_FUNCTION

Intention: "The intention of the City of Montreal is to make sure that BIXI Users will most likely find an

available bike at the BIXI station closest to their location."

Multiplicity: "Multiple Ensure Bike Availability scenarios can be active at a given time."

Primary Actor: HUMAN::CityofMontreal

Secondary Actor: PHYSICAL_ENTITY::BikeDock, HUMAN::ServicePerson

Main Success Scenario:

"The System detects that there is a BIXI station that has no available bikes left."

1. "System notifies the most appropriate* ServicePerson driving a bike truck with bikes about the station that has no

bikes."

2. "ServicePerson acknowledges task to System."

3. "ServicePerson drives with bike truck to the System station that has no bikes."

"Steps 4 and 5 are repeated for each bike that the Service Person drops off at the station."

4. "BikeDock informs System that ServicePerson is on site and has dropped off a bike."

5. "System requests BikeDock to lock the bike."

6. "ServicePerson informs System that his task is done."

use case ends in: SUCCESS

Extensions:

alternative for 1:

1a. "System determines that there currently are no ServicePerson with bikes on the road."

1a.1. "System notifies the most appropriate* ServicePerson driving an empty bike truck about the station that has no

bikes, and about the station from which he should go to pickup some bikes, and how many."

1a.2. "ServicePerson acknowledges task to System."

"ServicePerson drives to pickup BIXI station. Steps 1a.3 and 1a.3 are repeated for each bike that has to be picked

up."

1a.3. "BikeDock informs System that ServicePerson is on site and wants to remove the bike."

1a.4. "System requests BikeDock to unlock the bike."

Use case continues at step:3

Use Case: EnsureDockAvailability

Scope: BIXI_System

Level: SUB_FUNCTION

Intention: "The intention of the City of Montreal is to make sure that BIXI Users will most likely find an empty dock at the BIXI station closest to their destination location."

Multiplicity: "Multiple Ensure Dock Availability scenarios can be active at a given time."

Primary Actor: HUMAN::CityofMontreal

Secondary Actor: PHYSICAL_ENTITY::BikeDock, HUMAN::ServicePerson

Main Success Scenario:

"The system detects that there is a BIXI station that has no available bike docks left."

1. "System notifies the most appropriate* ServicePerson driving a bike truck that is not full about the station that has no empty docks, and about how many bikes to pickup."

2. "ServicePerson acknowledges task to System."

3. "ServicePerson drives with bike truck to the System station that has no free bike docks."

"Steps 4 and 5 are repeated for each bike that the Service Person picks up at the station."

4. "BikeDock informs System that ServicePerson is on site and wants to pickup a bike."

5. "System requests BikeDock to unlock the bike."

6. "ServicePerson informs System that his task is done."

use case ends in: SUCCESS

Handler Use Case: ServicePlatform

Scope: BIXI_System

Level: SUB_FUNCTION

Intention: "System needs to repair/troubleshoot platform components"

Primary Actor: None

Secondary Actor: HUMAN::ServicePerson, PHYSICAL_ENTITY::BikeDock

Contexts and Exceptions:

BecomeMember{NETWORK_EXCEPTION::UnableToConnectToBank},

BecomeMember{HARDWARE_EXCEPTION::BikeDockBroken},

BecomeMember{ENVIRONMENT_EXCEPTION::CarCrash}

Main Success Scenario:

1. "System sends a message that it needs a ServicePerson"

2. "ServicePerson assigned to service System BikeDock."

3. "ServicePerson arrives at System BikeDock that requested servicing."

4. "ServicePerson performs diagnostic on System componets."

5. "ServicePerson fixes the System component."

Use Case Ends In: SUCCESS

Extensions:

Alternative for 5:

"The System cannot be repaired on-site"

5a. "The ServicePerson replaces the damaged System componets with spare ones in the truck."

Use Case Ends In: SUCCESS