

Group 12	
Use-case Specification: Build Workout	Date: 23/February/2017

## Group 12

### Use-Case: Build Workout

#### 1 Brief Description

This use case describes how the trainer ride host uses the program to build a workout

#### 2 Actor Brief Descriptions

##### 2.1 Person designing the workout

#### 3 Preconditions

The option to make a new workout has been chosen from the program's main menu

#### 4 Basic Flow of Events

1. Person enters a name for the workout
2. Person enters description of the workout
3. Person adds segment to workout
4. Person adds more segments to the workout
5. Person saves the workout
6. Program returns to main menu
7. The use case ends.

#### 5 Alternative Flows

##### 5.1 None

#### 6 Subflows

##### 6.1 None

#### 7 Key Scenarios

##### 7.1 None

#### 8 Post-conditions

##### 8.1 Workout saved

The workout is saved in a format that can be read into the program if that workout is selected to run.

#### 9 Special Requirements

None

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Use-case Specification: Whole System	Date: 23/February/2017

## Group 12

### Use-Case: Whole System

#### 1 Brief Description

Program is started, then runs the chosen workout.

#### 2 Actor Brief Descriptions

##### 2.1 ANT+ enabled device

##### 2.2 Trainer Workout Host

#### 3 Preconditions

- At least one ANT+ USB stick is plugged into the computer
- Customers have accounts with their profile and device serial numbers saved in the database

#### 4 Basic Flow of Events

1. The program is started.
2. 'Start a trainer workout' button is clicked on from main menu.
3. A file finder window opens and the host selects a workout file to load.
4. The file loads correctly and is stored in a linked list.
5. The host selects the delay time for when the workout will start.
6. The host selects an end time for the workout to end.
7. Host starts the workout.
8. Workout screen is displayed and countdown for workout start time is shown.
9. ANT+ usb sticks find devices
10. Device serial numbers are looked up on database to find the user profile information
11. User profile is added to the screen.
12. Users' instantaneous ANT+ device data is shown on screen.
13. The workout starts and cycles through the workout segments.
14. The last workout segment ends.
15. The workout continues to run until the time of day is the end time.
16. The program returns to the main menu.

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17. The use case ends.

## 5 Alternative Flows

### 5.1 Invalid workout

If in step 4 of the basic flow the file produces an error when read into the linked list, then

1. Display error message to user.
2. Tell user to pick a different file.
3. User clicks 'okay'.
4. The use case resumes at step 1

### 5.2 Invalid start time

If in step 5 of the basic flow the host entered a start time that has already passed, then

1. Display error message: "enter a later time or leave blank to start the workout right away"
2. User clicks "Okay"
3. The use case resumes at step 5

### 5.3 Invalid end time

If in step 6 of the basic flow the host entered an end time that is earlier than the start time plus the total workout time, then

1. Display error message: "enter a later end time or leave blank to end the workout after the last segment"
2. User clicks "Okay"
3. The use case resumes at step 5

### 5.4 No ANT+ USB sticks found

If in step 2 of the basic flow the ANT+ USB sticks aren't found, then

1. Display error message: "No ANT+ USB sticks found. Plug in the usb sticks and click okay to search again"
2. User clicks "Okay"
3. The use case resumes at step 2

### 5.5 ALL ANT+ USB stick channels are full

If in step 9 of the basic flow all the ANT+ stick channels are full, then

1. Check for users that have a primary and secondary device connected.
2. Disconnect that channel from the secondary device
3. Use that now free channel to search for ANT+ devices
4. If no other devices found when workout starts, resynch with the device originally connected to.
5. The use case resumes at step 9

### 5.6 Unknown device

If in step 10 of the basic flow the ANT+ stick finds a device that isn't listed on the database, then

1. Display error message in that user profile window.
2. Display a cancel button to disconnect device, and a textbox for name and email.
3. User enters name and email.

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4. User profile is created and sent an email to finish creating their account later.
5. The use case resumes at step 10.

### **5.7 Workout ended**

If in any step of the basic flow the user presses the 'quit workout' button in the options menu, then

1. Message appears: "Are you sure you want to end the workout?"
2. User clicks 'yes'
3. The use case resumes at step 1

## **6 Subflows**

### **6.1 None**

## **7 Key Scenarios**

### **7.1 None**

## **8 Post-conditions**

### **8.1 users' workout data is saved to their profiles**

## **9 Special Requirements**

None

Group 12	
Use-case Specification: ANT+ Channel Controller	Date: 23/February/2017

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### Use-Case: ANT+ Channel Controller

#### 1 Brief Description

Each ANT+ usb stick of type 'M' or type '2' has 8 channels. Each channel can connect to one ANT+ device. An ANT+ device will send out data for whatever to receive. The ANT+ enabled bike sensor is the master, and the ANT+ USB stick channels are the slaves. multiple slaves can connect to one master. This means one part of the program has to control all of the ANT+ USB sticks and channels.

The program will display data for power meters, cadence and heart rate. Some people have all three sensors, some people only have one, and some people have no sensors.

Each user's profile will have the serial number for their primary sensor, and their secondary sensors. If someone only brought their secondary sensor, they should still get to be displayed on the screen. If their secondary sensor is found first, it shouldn't crash the program. If there isn't enough ANT+ channels for all the devices at the trainer ride, only connect to primary sensors. If a sensor intermittently loses signal, show it on the display that the connection was lost.

#### 2 Actor Brief Descriptions

##### 2.1 ANT+ USB Stick

##### 2.2 ANT+ enabled devices

##### 2.3 User database

#### 3 Preconditions

ANT+ USB sticks are plugged into the computer and readable by the program.

#### 4 Basic Flow of Events

1. The use case begins when the ANT+ Channel controller class object is created
2. Connect to all of the ANT+ USB sticks.
3. Connect to all of the channels on each ANT+ USB stick and save the channels as nodes in a 2d array.
4. Clear all of the channels on all the ANT+ USB sticks.
5. Open the next empty channel to search for power meters.
6. Open the next empty channel to search for heart rate devices.
7. Open the next empty channel to search for cadence sensors.
8. The program tells the controller to quit searching for devices.

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9. If there are available channels, fill them with any secondary sensors that were dropped.
10. Send the sensor data to the display (continuously) during the workout.
11. Reset the ANT+ USB sticks upon exiting the program
12. The use case ends.

## 5 Alternative Flows

### 5.1 Power meter found

If in step 5 of the basic flow the channel finds a power meter, then

1. Search the device serial number in the database.
2. Check if the user profile for this device is already loaded
3. If the device is primary, open a new user object and add their profile from the database.
4. If the device is secondary, see if the primary device has already been found and add it to the user profile
5. Start showing instantaneous power as received from the sensor.
6. The use case resumes at step 5

### 5.2 Heart rate sensor found

If in step 6 of the basic flow the channel finds a heart rate sensor, then

1. Search the device serial number in the database.
2. Check if the user profile for this device is already loaded
3. If the device is primary, open a new user object and add their profile from the database.
4. If the device is secondary, see if the primary device has already been found and add it to the user profile, else make a new user object and add their profile
5. Start showing instantaneous power as received from the sensor.
6. The use case resumes at step 6

### 5.3 cadence sensor found

If in step 7 of the basic flow the channel finds a heart rate sensor, then

1. Search the device serial number in the database.
2. Check if the user profile for this device is already loaded
3. If the device is primary, open a new user object and add their profile from the database.
4. If the device is secondary, see if the primary device has already been found and add it to the user profile, else make a new user object and add their profile
5. Start showing instantaneous power as received from the sensor.
6. The use case resumes at step 7

### 5.4 No more empty channels

If in step 5,6, or 7 of the basic flow there are no more empty channels, then

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1. If there is no channel looking for power sensor, and channel searching for heart rate sensor OR cadence sensor, reset it and look for power meters.
2. Find a user profile with a primary *and* secondary sensor and reset the channel that was being used for the secondary channel.
3. The use case resumes at step 5

## **6 Subflows**

**6.1 None**

## **7 Key Scenarios**

**7.1 None**

## **8 Post-conditions**

**8.1 Workout over**

reset the ANT+ USB sticks, or they'll stay connected to their frequencies when the program quits.

## **9 Special Requirements**

The trainer ride host should have enough ANT+ USB sticks for the amount of ANT+ sensors at the events.

Group 12	
Use-case Specification: Load Workout	Date: 23/February/2017

## Group 12

### Use-Case: Load Workout

#### 1 Brief Description

Host selects a pre constructed workout for the group, loads it, and starts the workout when participants are ready.

#### 2 Actor Brief Descriptions

##### 2.1 Host

#### 3 Preconditions

1. System must be started
2. Workouts have been created
3. Users devices linked via ANT+

#### 4 Basic Flow of Events

1. The use case begins when the host starts the program.
2. Host selects a workout that has been created.
3. Host sets delay
4. Host sets end time
5. Workout begins
6. The use case ends.

#### 5 Alternative Flows

##### 5.1 No Workouts Created

If in step 2 of the basic flow there are no workouts to be selected by the host, then



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1. The host will have the option to create a workout.
2. The host will have the option to select a basic default workout.
3. The use case resumes at step 3

### 5.2 Invalid Workout File

If in step 2 of the basic flow the host selects an invalid workout file then,

1. Error message displayed to host.
2. Prompt host to select alternative workout file.
3. Host selects a different workout file.
4. The use case resumes at step 3

### 5.3 Invalid Delay

If in step 3 of the basic flow the host enters a time that has passed then,

1. Error message displayed to host.
2. Prompt host to enter a new start time (delay).
3. Host selects "Ok".
4. The use case resumes at step 4

### 5.4 Invalid End Time

If in step 4 of the basic flow the host enters a time that has already passed then,

1. Error message displayed to host
2. Prompt host to enter a new valid end time.
3. Host selects "Ok"
4. The use case resumes at step 5

## 6 Subflows

### 6.1 None

## 7 Key Scenarios

### 7.1 None

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## **8 Post-conditions**

### **8.1 None**

## **9 Special Requirements**

None

### Group Participation

Nathan Franklin created the use cases for Build Workout, Whole System, and ANT+ channel controller.

Josh Baker created the use case for Load Workout, formatted document, and uploaded to online locations.