

Smart Time Entry System

For Android devices and Pebble Smartwatch

Cal Poly Computer Engineering Capstone

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3/16/14

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1. System Overview

The Smart Time Entry System is an integrated geo-fence tracking and time logging application utilizing Android and Pebble applications.

A geo-fence is a virtual perimeter defined in a real-world geographic area. In this application, a geo-fence is used to define your workplaces and help you to clock in and out while you transition between them. In addition it allows you to review your daily time entries for today and any previous day.

The main functions of the Smart Time Entry System are :

1. Set up your workplace location
2. Notify you when the you enter or exit your workplace location
3. Allow you to review your recorded work or break time

1.1 Android Application

- You can set up your workplace location and keep track of work or break time.
- Displays your current workplace location and your current number of work or break hours.
- You can clock in and clock out of your workplace.
- You can review your work and break time for your work days.

1.2 Pebble Application¹

- You can clock in and clock out of your workplace.
- Displays your current workplace location and your current number of work or break hours.

¹ Smart Time Entry System for Android is required to use Smart Time Entry System for Pebble.

2. Installation

2.1 Android Application

1. Install Smart Time Entry System for Android by running the Capsrock.apk located in the folder My Files/Downloads.
2. Run the application Capsrock

2.2 Pebble Application²

1. Pair your Android device with a Pebble watch.
2. Install Smart Time Entry System for Pebble by running the Capsrock.pbw located in the folder My Files/Downloads.
3. Running .pbw file will automatically install the Smart Time Entry System for Pebble.
4. After installation is complete, Pebble smart watch will automatically run the Smart Time Entry System for Pebble.

² Before installing Smart Time Entry System for Pebble application, it is necessary to download 'Pebble' application from Google Play Store.

3. How to use

3.1 Android Application

Smart Time Entry System for Android has 3 tabs that you can select.

1. Time Entry tab
 - This is where you can log your work or break time.
2. Timesheet tab
 - This tab will display your daily activity timesheet.
3. Activity tab
 - You can create an activity and choose to see your previous activities using this tab.

I. Time Entry

The Time Entry tab (*Figure 1*) contains 2 buttons, a time counter, and a location display. The buttons allow you to log or stop logging time. The counter displays the duration of the current time log. The location display shows if you are within a currently defined geo-fence, as set in the Activity tab.

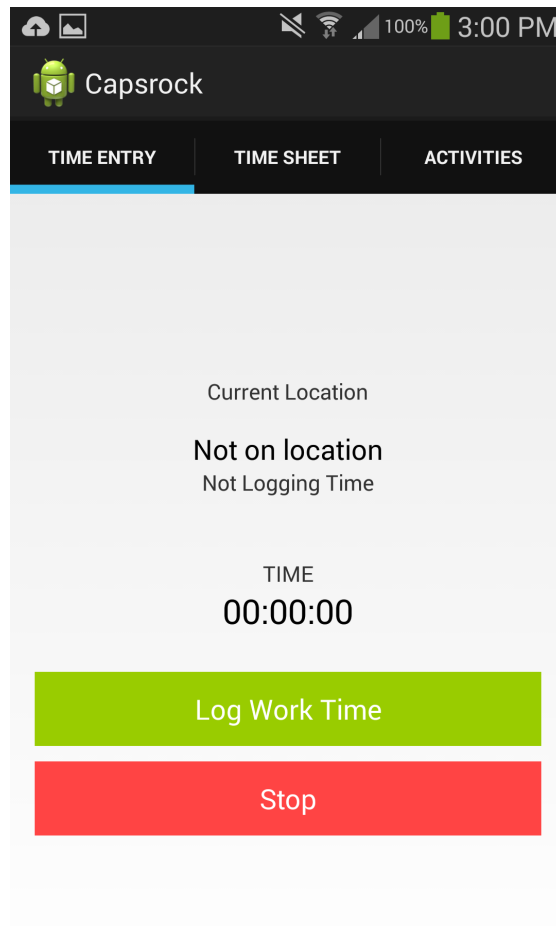


Figure 1: The Time Entry Tab

II. Timesheet

The Timesheet tab (*Figure 2*) contains 2 buttons, a date display, and a list of time logs. The buttons allow switching between days which will request all time log data from the server for that day. Note that you will not be able to select a future date, as it is not possible for there to be time logs from the future.



Figure 2: The Timesheet Tab

III. Activity

The Activity tab (*Figure 3*) contains 2 buttons for selecting a date, just as the Timesheet tab, as well as an “Add Activity” button which allows you to create a new geo-fence in which you can log time.

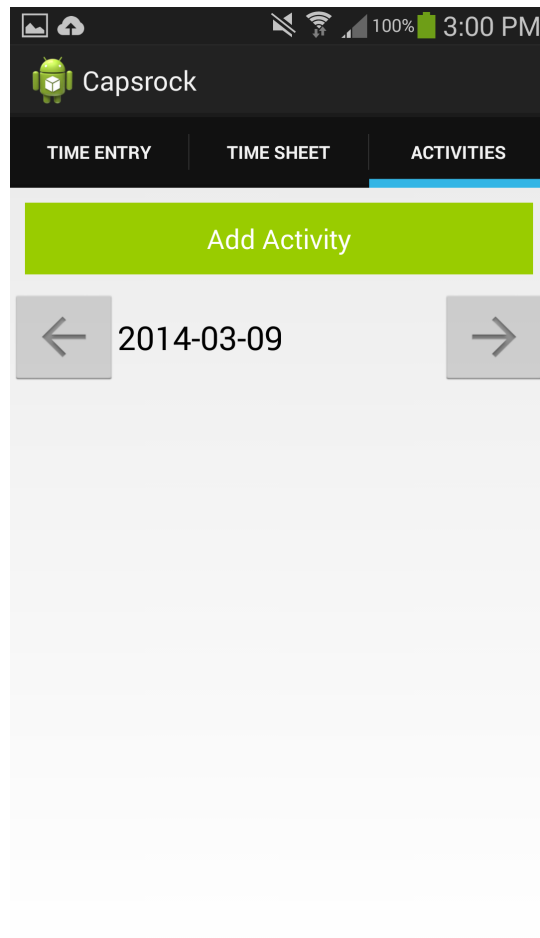


Figure 3: The Activities Tab

3.2 Pebble Application

The Pebble is a simple, optional interface, to allow you to log time with the application without needing to take out your phone. The basic pebble screen is shown below in *Figure 4*. On this screen you can see your current location, a currently active timelog, and buttons which allow you to start or stop logging time.

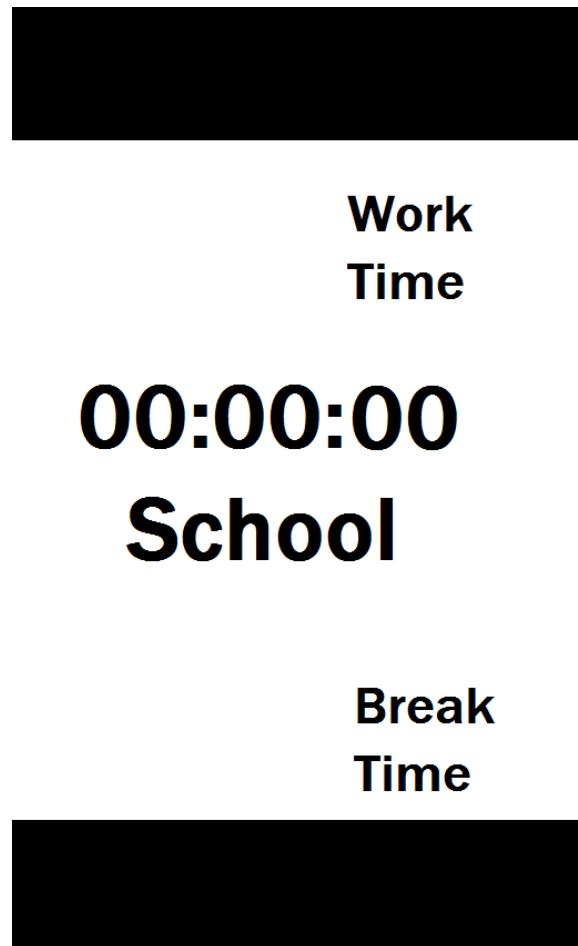


Figure 4: Pebble Main Screen

4. Application Flow

4.1 Android Application

From Adding Activity to Viewing Time Log

This section will cover a very common use case of this application, starting from adding an activity and ending with viewing the Time Logs from that activity.

1. On the Activities Tab (*Figure 3*) the user presses the “Add Activity” Button. The Dialog in *Figure 5* is shown. The user can enter the Name, Address and a note about the activity. The user can also choose the start and end times but these values are for display purposes only. They do not affect when the geofence is active. This Activity will be created for every day between the day the user was viewing before hitting “Add Activity” and the End Date chosen. The End Date defaults to be the same as the Start Date, but it can be changed by pressing “Choose End Date”, which will display the options shown in *Figure 6*.

The user then uses the slider to set the radius of the geofence (between 5m and 3000m)

Add Activity

Name: School

Address: 1 Grand Ave, San Luis Obispo

Note:

Choose End Date

Start: 2:59, End: 2:59

3:00, 3:00

4:01, 4:01

Radius: 570m

Add Cancel

Figure 5: Add Activity Dialog

Add Activity

Name: School

Address: 1 Grand Ave, San Luis Obispo

Note:

Choose Start/Stop Time

Choose End Date

Mar 09, Apr 10

S M T W T F S

11 9 10 11 12 13 14 15

12 16 17 18 19 20 21 22

13 23 24 25 26 27 28 29

14 30 31 1 2 3 4 5

15 6 7 8 9 10 11 12

Radius: 570m

Add Cancel

Figure 6: Add End Date

2. Once the Activity is Added, the summary will be added to that day's Activity List (*Figure 7*). If the End Date was set, it will also add this Activity to every day up to and including that day.

3. On entering the radius of the geofence, an alert will pop up asking if the user would like to start logging work time (*Figure 8*). If the user selects "No", no action will be taken. They will still be able to log time at that location on the Time Entry Tab, however. Clicking "Yes" will start the timer and switch the view to the Time Entry Tab (*Figure 9*).

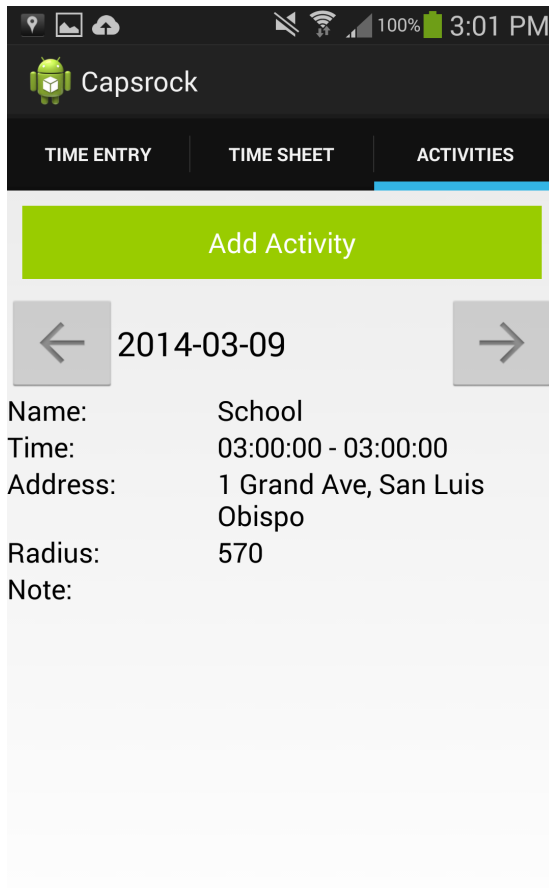


Figure 7: Activity Added Successfully

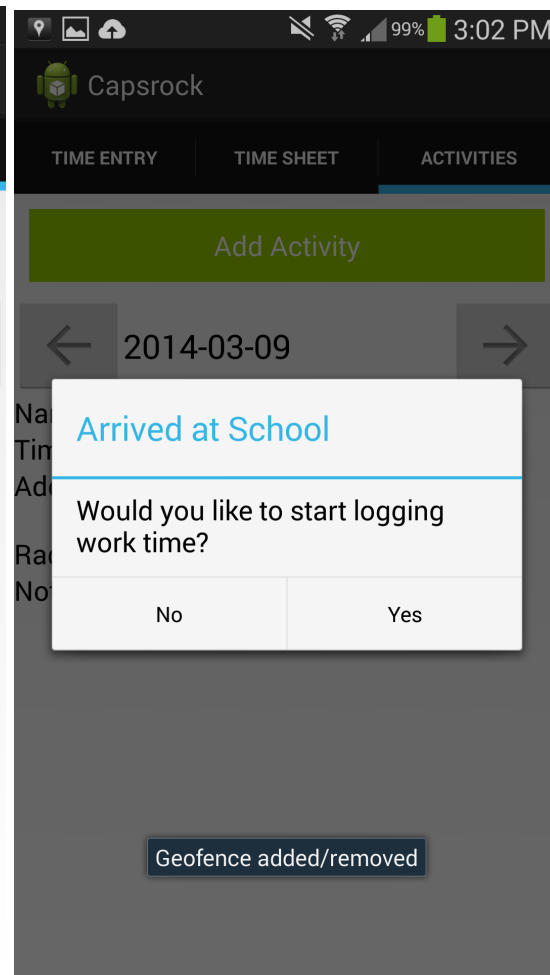


Figure 8: Enter Notification

4. The user can log Work Time until they decide to stop. If they want to switch to Break

Time, they can press “Log Break Time” and the interface will change to reflect the new timer and the new mode (*Figure 10*).

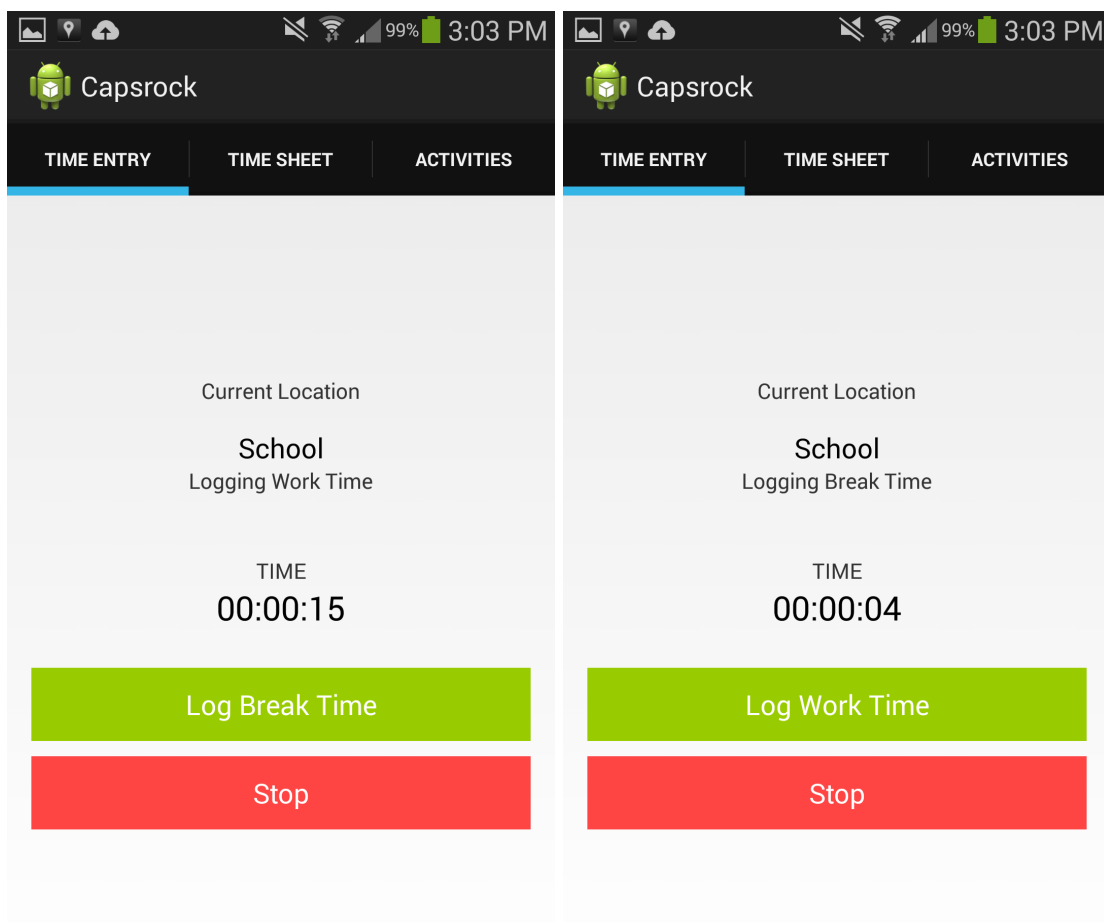


Figure 9: Logging Work Time

Figure 10: Logging Break Time

5. The user can press “Stop” to stop logging Time. This will update the interface to how it appears in *Figure 11*.

6. At any time, the user can go to the TimeSheet Tab. *Figure 12* shows the updated Timesheet with the cumulative Work and Break time for the “School” Location, as well as the initial Arrival Time (The earliest time logged) and the final Departure Time (the latest time logged). The Work/Break time does not necessarily account for the difference between these two times as you may have not been logging time for some duration while you were still at that location.

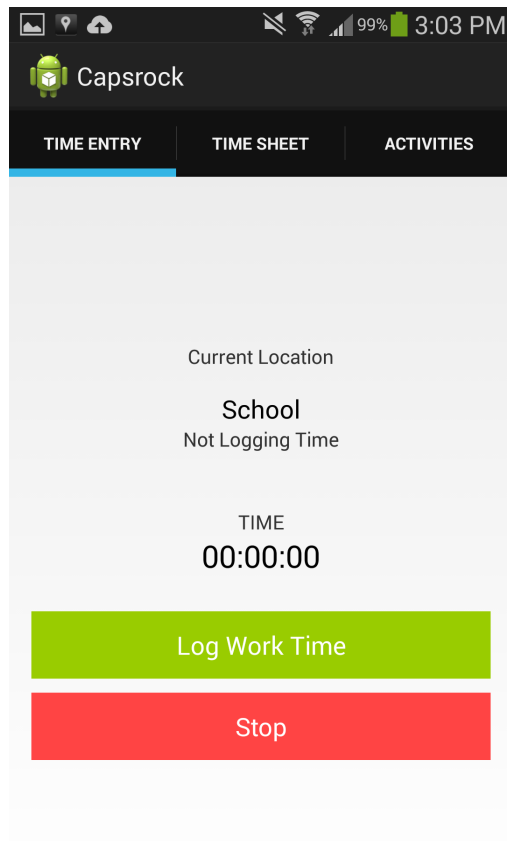


Figure 11: Not Logging Time



Figure 12: Timesheet

4.2 Pebble Application

From Entry to Exit

This section will cover a very common use case of this application - entering a geo-fence and logging time on the Pebble Smart Watch until the user exits.

1. When entering a geo-fence, the Pebble will vibrate and display the screen in *Figure 13*. The user has the option of clicking 'Yes' or 'No'. Both options lead to the same screen, but pressing 'Yes' will begin the timer in Work Mode (*Figure 14*).

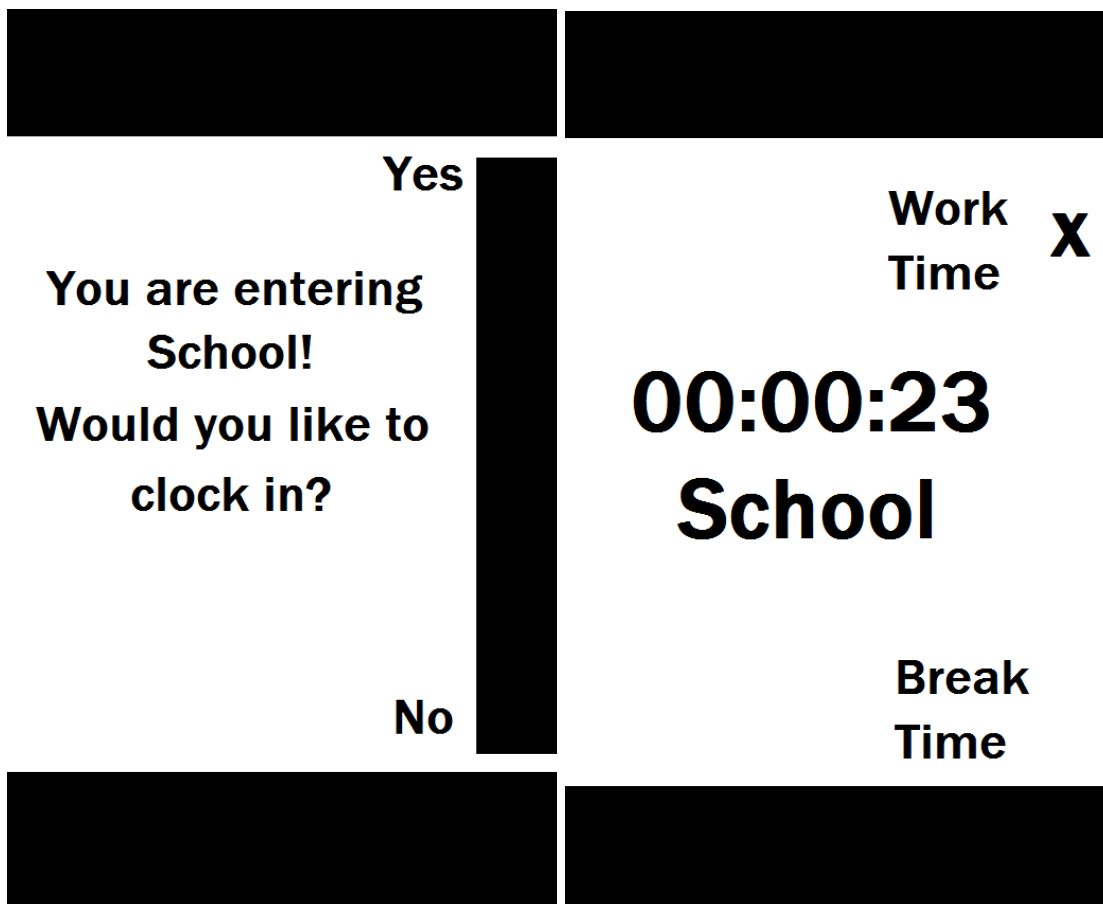


Figure 13: Entry Notification

Figure: 14 Logging Work on Pebble

2. To switch modes, the user has to press the corresponding button on their Pebble Smartwatch. Switching to Break Time will reset the timer and the display will update to the one shown in *Figure 15*. When the user decides to stop logging time (before leaving the geo-fence), they can do so by clicking the button for their currently active mode. If they are logging break time, pressing “Break Time” again will end the timer, set it back to zero and await further user input (*Figure 16*).

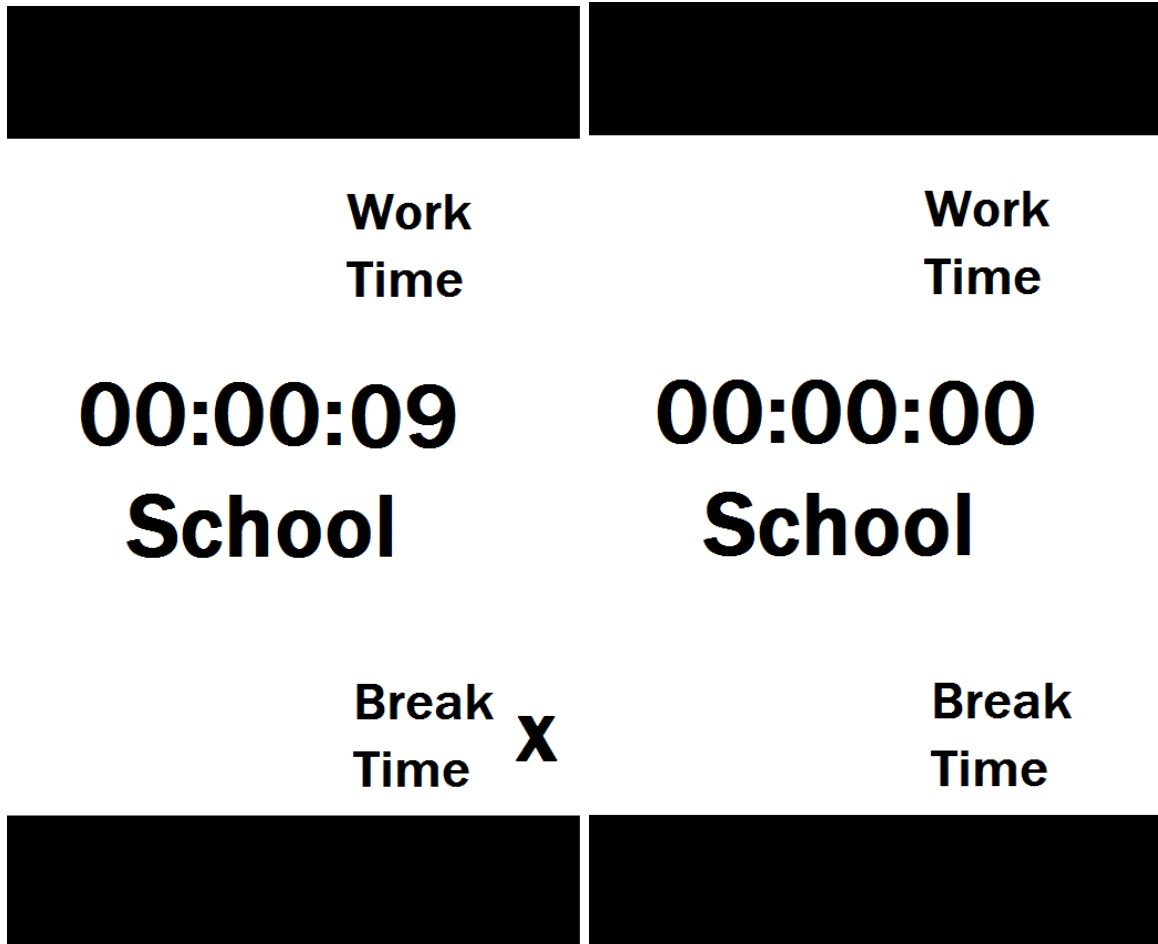


Figure 15: Logging Break Time

Figure 16: Not Logging Time

3. When the user exits the geo-fence, they will get the notification shown in *Figure 17*. The user can choose to keep logging time, but the system will automatically end the time log when they enter another geo-fence while their timer is still running.

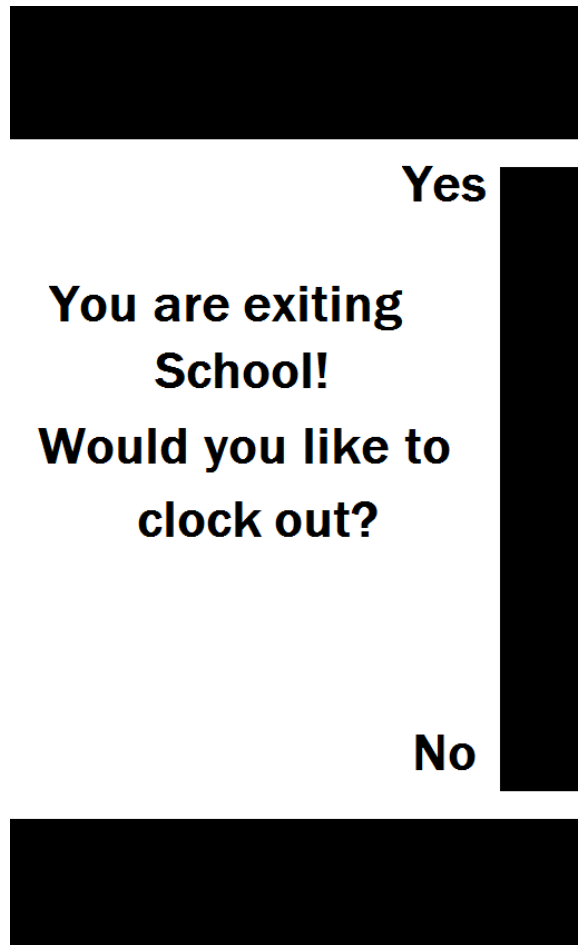


Figure 17: Exit Alert on Pebble

5. Troubleshooting

Q I can't get data in the Timesheet tab even though I know I've logged Time on those days

A Check the serverInfo.txt to be sure the connection string to the server is correct. If it is not, entries cannot be uploaded and timesheets cannot be downloaded.

Q The Pebble is not getting notifications when I enter/exit but the Android is

A Make sure the devices are paired. Check the Bluetooth settings on your phone.

Q There are no notifications to enter time when I enter a location.

A Be certain the address you entered is non-ambiguous. "123 Main Street" will not guarantee the geo-fence registered will be the one you are referring to. Use a zip code whenever you can. Be sure the radius is set appropriately, keeping in mind the units are in meters.