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| Introduction to Engineering  mid-term  Version 1.0 ● |
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This document outlines the design details for my midterm project. The most important element of this documentation is the diagram found on page three.

# mid-term

Package in package 'homework'

mid-term

Version 1.0 Phase 1.0 Proposed

Jessica created on 9/21/2019. Last modified 9/21/2019

## mid-term diagram

Object diagram in package 'mid-term'

mid-term

Version 1.0

Jessica Gardner created on 9/21/2019. Last modified 9/21/2019



1. mid-term

## Jessica's Mid-term Project Design

Boundary in package 'mid-term'

Jessica's Mid-term Project Design

Version 1.0 Phase 1.0 Proposed

Jessica Gardner created on 9/21/2019. Last modified 9/21/2019

Extends

## My Object Definitions

Boundary in package 'mid-term'

My Object Definitions

Version 1.0 Phase 1.0 Proposed

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Extends

## Note

Note in package 'mid-term'

This program creates a timer. The user can either press button A, which adds one hour to the timer, or button B, which adds five minutes to the timer. The user can set the desired amount of time by pressing either button as needed. After each modification to the timer, the new time set will show on the screen. If the timer gets set to an amount beyond the desired time, the user can shake the microbit and the timer will reset back to zero. When the desired time is set, the user then will press both Button A and Button B at the same time in order to start the timer. The timer will display an image on the screen as the timer is running. After both Button A and Button B have been pressed, the timer will decrement itself by one every second until the timer reaches zero. Once the timer reaches zero, the microbit will play a tone to alert the user that the desired amount of time has passed.

Note

Version 1.0 Phase 1.0 Proposed

Jessica Gardner created on 9/21/2019. Last modified 9/21/2019

Extends

## A Button Press

ActivityInitial in package 'mid-term'

Sets the number of hours to add to the counter.

| OUTGOING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from A Button Press to Set Hours |

| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from User to A Button Press |

## B Button Press

ActivityInitial in package 'mid-term'

| OUTGOING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from B Button Press to Set Minutes |

| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from User to B Button Press |

## Press A + B Buttons

ActivityInitial in package 'mid-term'

Both buttons must be pressed at the same time.

| OUTGOING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from Press A + B Buttons to Display Image |

| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from User to Press A + B Buttons |

## Cook

Actor in package 'mid-term'

Someone who needs to set a timer for baking.

Cook

Version 1.0 Phase 1.0 Proposed

Jessica Gardner created on 9/21/2019. Last modified 9/21/2019

| OUTGOING STRUCTURAL RELATIONSHIPS |
| --- |
| Generalization from Cook to User  [ Direction is 'Source -> Destination'. ] |

## Cook

Actor in package 'mid-term'

Someone who needs to set a timer for food in the oven.

Cook

Version 1.0 Phase 1.0 Proposed

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| OUTGOING STRUCTURAL RELATIONSHIPS |
| --- |
| Generalization from Cook to User  [ Direction is 'Source -> Destination'. ] |

## Fitness buff

Actor in package 'mid-term'

Someone who needs to use the microbit program to count down minutes doing a plank.

Fitness buff

Version 1.0 Phase 1.0 Proposed

Jessica Gardner created on 9/21/2019. Last modified 9/21/2019

| OUTGOING STRUCTURAL RELATIONSHIPS |
| --- |
| Generalization from Fitness buff to User  [ Direction is 'Source -> Destination'. ] |

## Napper

Actor in package 'mid-term'

Someone who needs to set an alarm to wake up before a certain time.

Napper

Version 1.0 Phase 1.0 Proposed

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| OUTGOING STRUCTURAL RELATIONSHIPS |
| --- |
| Generalization from Napper to User  [ Direction is 'Source -> Destination'. ] |

## Student

Actor in package 'mid-term'

Someone who needs this timer to work to get an A.

Student

Version 1.0 Phase 1.0 Proposed

Jessica Gardner created on 9/21/2019. Last modified 9/21/2019

| OUTGOING STRUCTURAL RELATIONSHIPS |
| --- |
| Generalization from Student to User  [ Direction is 'Source -> Destination'. ] |

## User

Actor in package 'mid-term'

Represents any type of user.

User

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| OUTGOING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from User to A Button Press |
| ControlFlow from User to B Button Press |
| ControlFlow from User to Press A + B Buttons |

| INCOMING STRUCTURAL RELATIONSHIPS |
| --- |
| Generalization from Cook to User  [ Direction is 'Source -> Destination'. ] |
| Generalization from Fitness buff to User  [ Direction is 'Source -> Destination'. ] |
| Generalization from Cook to User  [ Direction is 'Source -> Destination'. ] |
| Generalization from Student to User  [ Direction is 'Source -> Destination'. ] |
| Generalization from Napper to User  [ Direction is 'Source -> Destination'. ] |

## hour

Class in package 'mid-term'

hour

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| CONNECTORS |
| --- |
| Trace «trace» Source -> Destination  From: Set Hours : Activity, Public  To: hour : Class, Public |

| ATTRIBUTES |
| --- |
| label : string Public  The label is what will be displayed after the number in order to make it clear that the time is in hours.  [ Is static True. Containment is Not Specified. ] |
| name : string Public  Makes it clear that the object deals with hours.  [ Is static True. Containment is Not Specified. ] |

| OPERATIONS |
| --- |
| start () : void Public  Initiates the decrementing of the timer after the object is instantiated.  [ Is static False. Is abstract False. Is return array False. Is query False. Is synchronized False. ] |

## minute

Class in package 'mid-term'

The object that allows the user to set the amount of minutes desired on the timer.

minute

Version 1.0 Phase 1.0 Proposed

Jessica Gardner created on 9/21/2019. Last modified 9/21/2019

| CONNECTORS |
| --- |
| Trace «trace» Source -> Destination  From: Set Minutes : Activity, Public  To: minute : Class, Public |

| ATTRIBUTES |
| --- |
| label : string Public  What is displayed after the number to indicate that the timer is set in minutes.  [ Is static True. Containment is Not Specified. ] |
| name : string Public  Indicates that this object deals with minutes.  [ Is static True. Containment is Not Specified. ] |

| OPERATIONS |
| --- |
| start () : void Public  Initiates the decrementing of the timer.  [ Is static False. Is abstract False. Is return array False. Is query False. Is synchronized False. ] |

## Decrement Timer

Activity in package 'mid-term'

Decrement Counter

Version 1.0 Phase 1.0 Proposed

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| OUTGOING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from Decrement Counter to Is timer 0? |

| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| Name: No  ControlFlow from Is timer 0? to Decrement Counter |
| ControlFlow from Display Image to Decrement Counter |

## Display Image

Activity in package 'mid-term'

Display Image

Version 1.0 Phase 1.0 Proposed

Jessica Gardner created on 9/21/2019. Last modified 9/21/2019

| OUTGOING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from Display Image to Decrement Counter |

| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from Press A + B Buttons to Display Image |

## Play Tone

Activity in package 'mid-term'

Play an obnoxious tone in the note of C so that the user knows the time has passed.

Play Tone

Version 1.0 Phase 1.0 Proposed

Jessica Gardner created on 9/21/2019. Last modified 9/21/2019

| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| Name: yes  ControlFlow from Is timer 0? to Play Tone |

## Set Hours

Activity in package 'mid-term'

Set Hours

Version 1.0 Phase 1.0 Proposed

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| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from A Button Press to Set Hours |

| CONNECTORS |
| --- |
| Trace «trace» Source -> Destination  From: Set Hours : Activity, Public  To: hour : Class, Public |

## Set Minutes

Activity in package 'mid-term'

Set Minutes

Version 1.0 Phase 1.0 Proposed

Jessica Gardner created on 9/21/2019. Last modified 9/21/2019

| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from B Button Press to Set Minutes |

| CONNECTORS |
| --- |
| Trace «trace» Source -> Destination  From: Set Minutes : Activity, Public  To: minute : Class, Public |

## A Button Press

ActivityInitial in package 'mid-term'

Sets the number of hours to add to the counter.

| OUTGOING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from A Button Press to Set Hours |

| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from User to A Button Press |

## B Button Press

ActivityInitial in package 'mid-term'

| OUTGOING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from B Button Press to Set Minutes |

| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from User to B Button Press |

## Is timer 0?

DecisionNode in package 'mid-term'

| OUTGOING BEHAVIORAL RELATIONSHIPS |
| --- |
| Name: No  ControlFlow from Is timer 0? to Decrement Counter |
| Name: yes  ControlFlow from Is timer 0? to Play Tone |

| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from Decrement Counter to Is timer 0? |

## Press A + B Buttons

ActivityInitial in package 'mid-term'

Both buttons must be pressed at the same time.

| OUTGOING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from Press A + B Buttons to Display Image |

| INCOMING BEHAVIORAL RELATIONSHIPS |
| --- |
| ControlFlow from User to Press A + B Buttons |