Implementation Document

Focus!

Prepared by ProFlo

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1. Preface

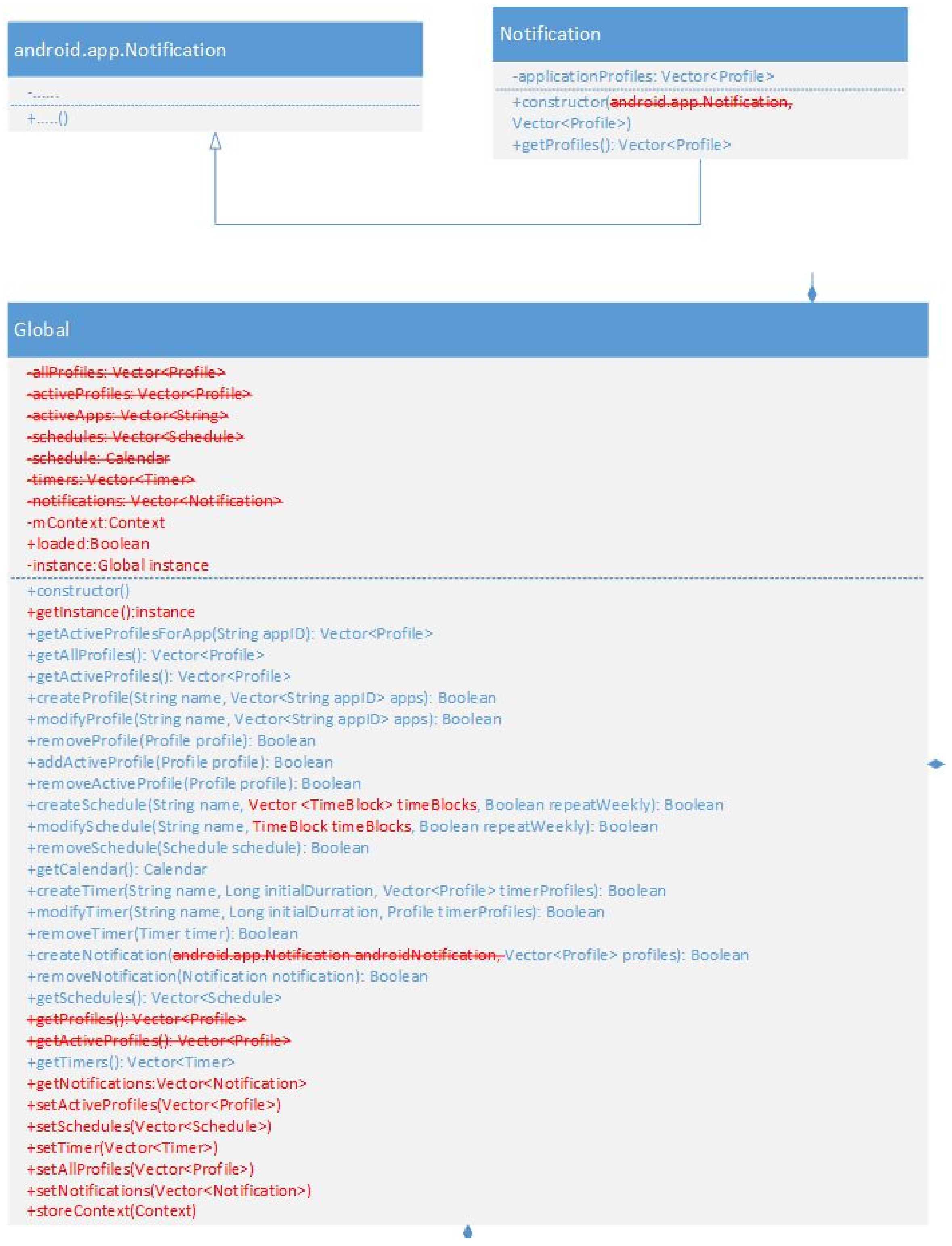
The purpose of this Implementation Document is to provide an overview of the changes that were made from the original Software Design Documentation as well as our rationalization as to why these changes were needed and beneficial. The diagrams below will note the changes which are seen in the red font. Anything that is red with a strikethrough was removed, anything that is just red was added, and any blue remained the same.

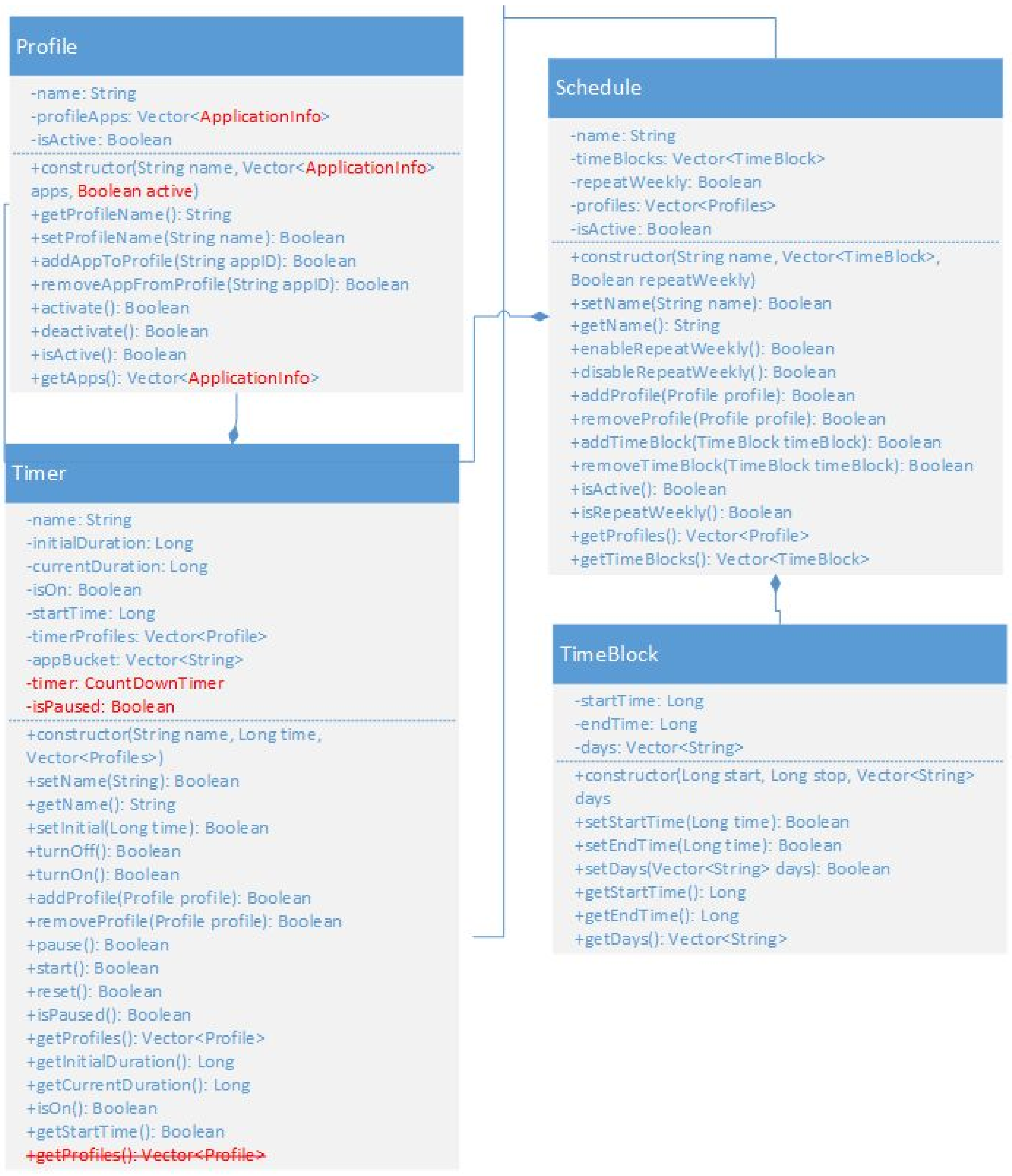
2. Introduction

Focus! Is implemented on Android using an implicit invocation architectural style, with a Model-View-Controller pattern. The model contains any and all data, the Android GUI is our view, and the controller is the backend, and all data manipulation. Due to our use of an implicit invocation style, we can use listers to control much of the application. MVC was chosen largely due to the dynamic nature of the application, and the requirements of working within Android.

No changes were made to the original architectural style or design as the high level parts seemed to work exceptionally well together. There were however, small tweaks made to the class diagrams of both the model and the controller. Section 3 will go into detail about the changes to the class diagram for the model as well as the reasoning and section 4 will provide the same for the class diagram of the controller.

3. Changes To The Model Class Diagram


android.app.Notification
-......
+.....()
Notification
-applicationProfiles: Vector<Profile>
+constructor(~~android.app.Notification,~~ Vector<Profile>)
+getProfiles(): Vector<Profile>
Global
~~-allProfiles: Vector<Profile>~~
~~-activeProfiles: Vector<Profile>~~
~~-activeApps: Vector<String>~~
~~-schedules: Vector<Schedule>~~
~~-schedule: Calendar~~
~~-timers: Vector<Timer>~~
~~-notifications: Vector<Notification>~~
-mContext:Context
+loaded:Boolean
-instance:Global instance
+constructor()
+getInstance():instance
+getActiveProfilesForApp(String appID): Vector<Profile>
+getAllProfiles(): Vector<Profile>
+getActiveProfiles(): Vector<Profile>
+createProfile(String name, Vector<String appID> apps): Boolean
+modifyProfile(String name, Vector<String appID> apps): Boolean
+removeProfile(Profile profile): Boolean
+addActiveProfile(Profile profile): Boolean
+removeActiveProfile(Profile profile): Boolean
+createSchedule(String name, Vector <TimeBlock> timeBlocks, Boolean repeatWeekly): Boolean
+modifySchedule(String name, TimeBlock timeBlocks, Boolean repeatWeekly): Boolean
+removeSchedule(Schedule schedule): Boolean
+getCalendar(): Calendar
+createTimer(String name, Long initialDurration, Vector<Profile> timerProfiles): Boolean
+modifyTimer(String name, Long initialDurration, Profile timerProfiles): Boolean
+removeTimer(Timer timer): Boolean
+createNotification(~~android.app.Notification androidNotification,~~ Vector<Profile> profiles): Boolean
+removeNotification(Notification notification): Boolean
+getSchedules(): Vector<Schedule>
~~+getProfiles(): Vector<Profile>~~
~~+getActiveProfiles(): Vector<Profile>~~
+getTimers(): Vector<Timer>
+getNotifications:Vector<Notification>
+setActiveProfiles(Vector<Profile>)
+setSchedules(Vector<Schedule>)
+setTimer(Vector<Timer>)
+setAllProfiles(Vector<Profile>)
+setNotifications(Vector<Notification>)
+storeContext(Context)


Profile
-name: String
-profileApps: Vector<ApplicationInfo>
-isActive: Boolean
+constructor(String name, Vector<ApplicationInfo> apps, Boolean active)
+getProfileName(): String
+setProfileName(String name): Boolean
+addAppToProfile(String appID): Boolean
+removeAppFromProfile(String appID): Boolean
+activate(): Boolean
+deactivate(): Boolean
+isActive(): Boolean
+getApps(): Vector<ApplicationInfo>
Timer
-name: String
-initialDuration: Long
-currentDuration: Long
-isOn: Boolean
-startTime: Long
-timerProfiles: Vector<Profile>
-appBucket: Vector<String>
-timer: CountDownTimer
-isPaused: Boolean
+constructor(String name, Long time, Vector<Profiles>)
+setName(String): Boolean
+getName(): String
+setInitial(Long time): Boolean
+turnOff(): Boolean
+turnOn(): Boolean
+addProfile(Profile profile): Boolean
+removeProfile(Profile profile): Boolean
+pause(): Boolean
+start(): Boolean
+reset(): Boolean
+isPaused(): Boolean
+getProfiles(): Vector<Profile>
+getInitialDuration(): Long
+getCurrentDuration(): Long
+isOn(): Boolean
+getStartTime(): Boolean
~~+getProfiles(): Vector<Profile>~~
Schedule
-name: String
-timeBlocks: Vector<TimeBlock>
-repeatWeekly: Boolean
-profiles: Vector<Profiles>
-isActive: Boolean
+constructor(String name, Vector<TimeBlock>, Boolean repeatWeekly)
+setName(String name): Boolean
+getName(): String
+enableRepeatWeekly(): Boolean
+disableRepeatWeekly(): Boolean
+addProfile(Profile profile): Boolean
+removeProfile(Profile profile): Boolean
+addTimeBlock(TimeBlock timeBlock): Boolean
+removeTimeBlock(TimeBlock timeBlock): Boolean
+isActive(): Boolean
+isRepeatWeekly(): Boolean
+getProfiles(): Vector<Profile>
+getTimeBlocks(): Vector<TimeBlock>
TimeBlock
-startTime: Long
-endTime: Long
-days: Vector<String>
+constructor(Long start, Long stop, Vector<String> days
+setStartTime(Long time): Boolean
+setEndTime(Long time): Boolean
+setDays(Vector<String> days): Boolean
+getStartTime(): Long
+getEndTime(): Long
+getDays(): Vector<String>

3.1 Changes to Notification

The only change that was made to the Notification class was in the constructor, originally it took in an android.app.Notification object, however, since it already inherits from that class there was no need for that to be passed in.

3.2 Changes to Global

There were multiple made in the Global class. The first was utilizing the TimeBlock class we created for creating and modifying the schedule. Previously a vector of Triplets was passed through, by utilizing the TimeBlock class it will be much easier and cleaner when utilizing these methods in other classes.

Next we adapted the class to use instances instead of storing all the date in a single object. This enables us to integrate the SharedPreferences that Android uses much more smoothly providing more adaptability and increasing the app's ability to scale. There were also getters and setters added which utilize these SharedPreferences and help to set some of the global variables within each instance.

Finally, there were a few removals made from the original diagram. The first was in the createNotification method and that was removed so it could match the newly changed constructor in the Nofitication class(see above for further explanation). The removal of the getProfiles and getActiveProfiles methods are simply because they are duplicates and exist further up in the UML.

3.3 Changes to Profile

The only change made to the active class was the added parameter of a boolean representing if a profile is active or not in the constructor. This allows for the active status of a profile to be set on initialization and prevent undefined behavior if isActive() is called before that variable is set.

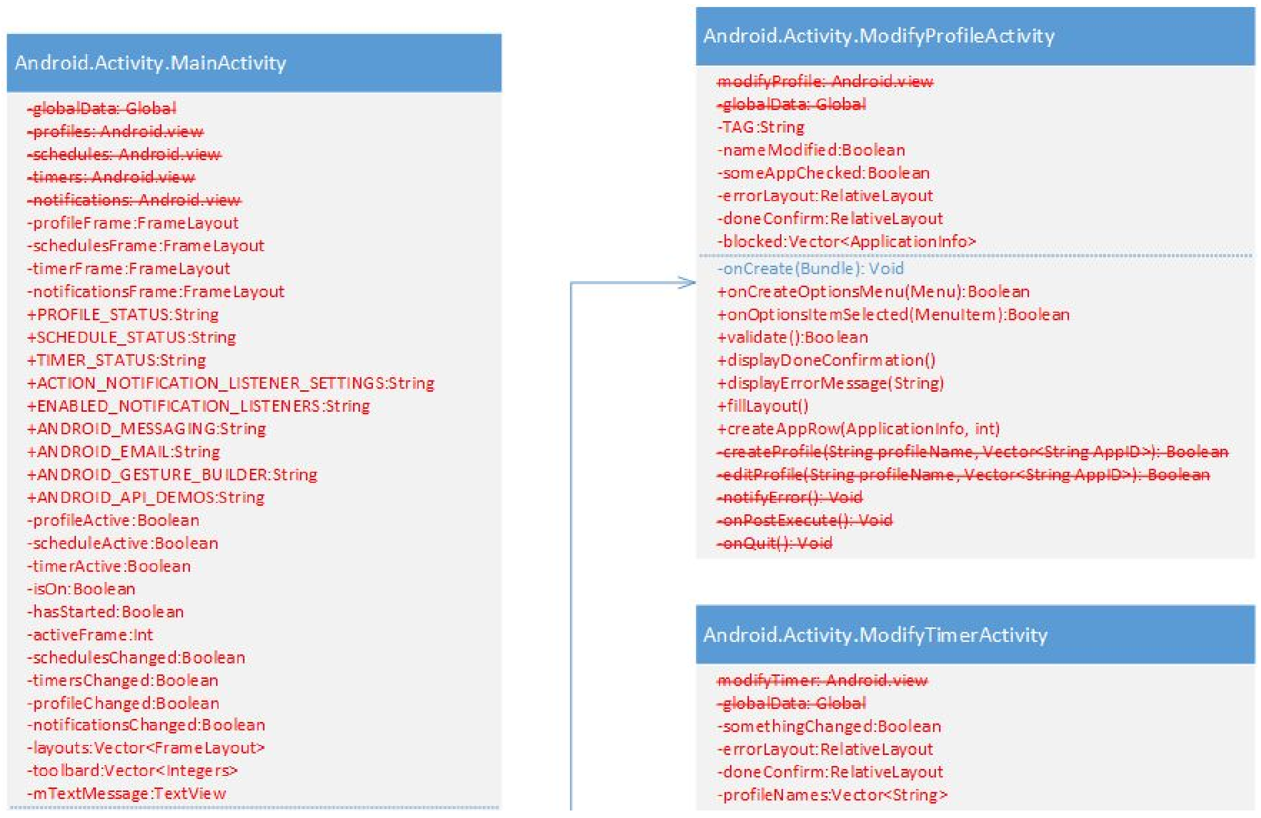
3.4 Changes to Timer

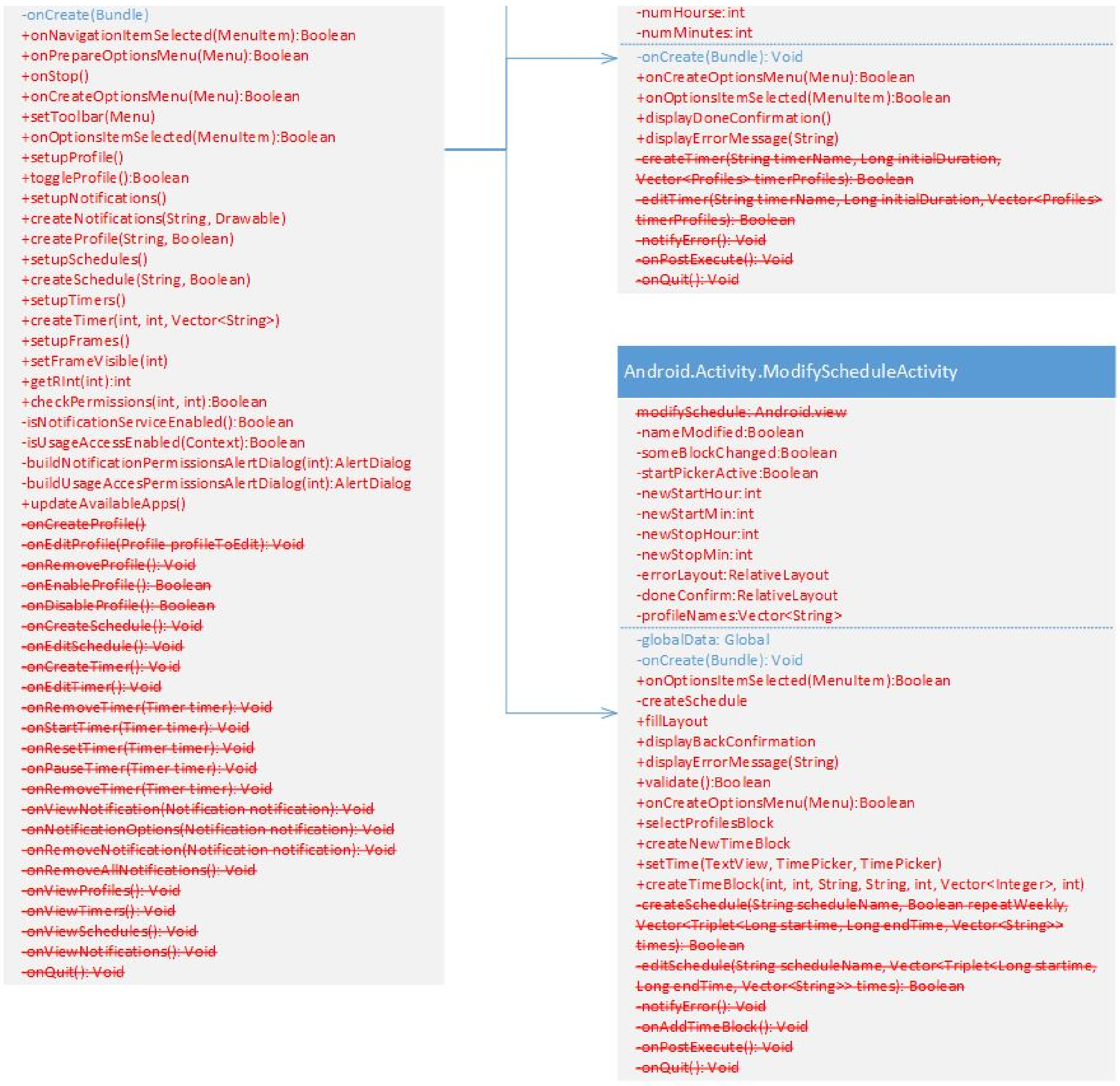
There were 2 major changes made to timer. The first was implementing a timer member which utilizes android's CountDownTimer object. The main decision for this was we decided it would be much simpler to use the pre existing object instead of trying to rewrite a timer when one already existed.

The second change made was to add a Boolean that tracks whether a timer is currently paused or not. This will be a much easier method than attempting to use the timer object itself and see if it is currently counting down or if it is inactive.

The final change made was to simply get rid of the duplicate getProfiles method.

3.2 Changes to the Model Class Diagram


Android.Activity.MainActivity
~~-globalData: Global~~
~~-profiles: Android.view~~
~~-schedules: Android.view~~
~~-timers: Android.view~~
~~-notifications: Android.view~~
-profileFrame:FrameLayout
-schedulesFrame:FrameLayout
-timerFrame:FrameLayout
-notificationsFrame:FrameLayout
+PROFILE_STATUS:String
+SCHEDULE_STATUS:String
+TIMER_STATUS:String
+ACTION_NOTIFICATION_LISTENER_SETTINGS:String
+ENABLED_NOTIFICATION_LISTENERS:String
+ANDROID_MESSAGING:String
+ANDROID_EMAIL:String
+ANDROID_GESTURE_BUILDER:String
+ANDROID_API_DEMOS:String
-profileActive:Boolean
-scheduleActive:Boolean
-timerActive:Boolean
-isOn:Boolean
-hasStarted:Boolean
-activeFrame:Int
-schedulesChanged:Boolean
-timersChanged:Boolean
-profileChanged:Boolean
-notificationsChanged:Boolean
-layouts:Vector<FrameLayout>
-toolbard:Vector<Integers>
-mTextMessage:TextView
Android.Activity.ModifyProfileActivity
~~modifyProfile: Android.view~~
~~-globalData: Global~~
-TAG:String
-nameModified:Boolean
-someAppChecked:Boolean
-errorLayout:RelativeLayout
-doneConfirm:RelativeLayout
-blocked:Vector<ApplicationInfo>
-onCreate(Bundle): Void
+onCreateOptionsMenu(Menu):Boolean
+onOptionsItemSelected(MenuItem):Boolean
+validate():Boolean
+displayDoneConfirmation()
+displayErrorMessage(String)
+fillLayout()
+createAppRow(ApplicationInfo, int)
~~-createProfile(String profileName, Vector<String AppID>): Boolean~~
~~-editProfile(String profileName, Vector<String AppID>): Boolean~~
~~-notifyError(): Void~~
~~-onPostExecute(): Void~~
~~-onQuit(): Void~~
Android.Activity.ModifyTimerActivity
~~modifyTimer: Android.view~~
~~-globalData: Global~~
-somethingChanged:Boolean
-errorLayout:RelativeLayout
-doneConfirm:RelativeLayout
-profileNames:Vector<String>



-onCreate(Bundle)
+onNavigationItemSelected(MenuItem):Boolean
+onPrepareOptionsMenu(Menu):Boolean
+onStop()
+onCreateOptionsMenu(Menu):Boolean
+setToolbar(Menu)
+onOptionsItemSelected(MenuItem):Boolean
+setupProfile()
+toggleProfile():Boolean
+setupNotifications()
+createNotifications(String, Drawable)
+createProfile(String, Boolean)
+setupSchedules()
+createSchedule(String, Boolean)
+setupTimers()
+createTimer(int, int, Vector<String>)
+setupFrames()
+setFrameVisible(int)
+getRInt(int):int
+checkPermissions(int, int):Boolean
-isNotificationServiceEnabled():Boolean
-isUsageAccessEnabled(Context):Boolean
-buildNotificationPermissionsAlertDialog(int):AlertDialog
-buildUsageAccesPermissionsAlertDialog(int):AlertDialog
+updateAvailableApps()
~~-onCreateProfile()~~
~~-onEditProfile(Profile profileToEdit): Void~~
~~-onRemoveProfile(): Void~~
~~-onEnableProfile(): Boolean~~
~~-onDisableProfile(): Boolean~~
~~-onCreateSchedule(): Void~~
~~-onEditSchedule(): Void~~
~~-onCreateTimer(): Void~~
~~-onEditTimer(): Void~~
~~-onRemoveTimer(Timer timer): Void~~
~~-onStartTimer(Timer timer): Void~~
~~-onResetTimer(Timer timer): Void~~
~~-onPauseTimer(Timer timer): Void~~
~~-onRemoveTimer(Timer timer): Void~~
~~-onViewNotification(Notification notification): Void~~
~~-onNotificationOptions(Notification notification): Void~~
~~-onRemoveNotification(Notification notification): Void~~
~~-onRemoveAllNotifications(): Void~~
~~-onViewProfiles(): Void~~
~~-onViewTimers(): Void~~
~~-onViewSchedules(): Void~~
~~-onViewNotifications(): Void~~
~~-onQuit(): Void~~

-numHourse:int
-numMinutes:int
-onCreate(Bundle): Void
+onCreateOptionsMenu(Menu):Boolean
+onOptionsItemSelected(MenuItem):Boolean
+displayDoneConfirmation()
+displayErrorMessage(String)
~~-createTimer(String timerName, Long initialDuration, Vector<Profiles> timerProfiles): Boolean~~
~~-editTimer(String timerName, Long initialDuration, Vector<Profiles> timerProfiles): Boolean~~
~~-notifyError(): Void~~
~~-onPostExecute(): Void~~
~~-onQuit(): Void~~

Android.Activity.ModifyScheduleActivity

~~modifySchedule: Android.view~~
-nameModified:Boolean
-someBlockChanged:Boolean
-startPickerActive:Boolean
-newStartHour:int
-newStartMin:int
-newStopHour:int
-newStopMin:int
-errorLayout:RelativeLayout
-doneConfirm:RelativeLayout
-profileNames:Vector<String>
-globalData: Global
-onCreate(Bundle): Void
+onOptionsItemSelected(MenuItem):Boolean
-createSchedule
+fillLayout
+displayBackConfirmation
+displayErrorMessage(String)
+validate():Boolean
+onCreateOptionsMenu(Menu):Boolean
+selectProfilesBlock
+createNewTimeBlock
+setTime(TextView, TimePicker, TimePicker)
+createTimeBlock(int, int, String, String, int, Vector<Integer>, int)
~~-createSchedule(String scheduleName, Boolean repeatWeekly, Vector<Triplet<Long startime, Long endTime, Vector<String>> times): Boolean~~
~~-editSchedule(String scheduleName, Vector<Triplet<Long startime, Long endTime, Vector<String>> times): Boolean~~
~~-notifyError(): Void~~
~~-onAddTimeBlock(): Void~~
~~-onPostExecute(): Void~~
~~-onQuit(): Void~~

3.2.1 A Look Into The Activity Classes

Due to the excessively large number of additions and subtractions it would be pointless to go into the reasoning for every single one. What is clear is that as the implementation started we quickly realized our understanding of Android would drastically evolve. The changes depicted above shows the transition to the typical activity listeners that are used to our custom written ones which are much more specific to the actions being taken within our app.

We also included many global variables that would be used throughout the rest of the app, as well as things such as layout and frame transitions. In short the majority of the changes within the activity class stem from us changing how we decided to structure the class interactions, as well as the scope of what we use the activity class for.