



Moralife Design Document

A Software Design Document for the Moralife software product
by Team Axe, LLC

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Document History

This table outlines the revision history of the document.

Author	Date	Revision	Note
Aaxe	02/24/2010	0.1	Initial Version
Aaxe	02/27/2010	0.2	Addition of Vision Statement, Requirements examples
Aaxe	03/08/2010	0.3	Implementation of Technology, Database Sections, temporary logo
Aaxe	03/17/2010	0.4	Implementation of Project Methodology section and User Interface section. First Visual designs added.
Aaxe	03/26/2010	0.5	Domain model, IA, Calculations added. Scope reduced.
Aaxe	04/01/2010	1	Completed.
Aaxe	04/23/2010	1.1	Updated Model, Added Licensing
Aaxe	04/27/2010	1.2	Revision to Conscience screen, Disposition calculations added
Aaxe	06/16/2010	1.5	Avatar to Conscience revision, Moral Grade and Mood calculations adjusted
Aaxe	07/09/2010	1.6	Auditory Section added
Aaxe	12/12/2010	1.7	Revision after review of feature-set
Aaxe	4/12/2012	2.0	Conversion to Pages

Introduction

This design document will outline the high-level implementation details of the software known as Moraliife. All design decisions and justifications will be outlined here, while more detail-oriented facets of the design will reside in the code-base and object models.

Additional documentation is available:

- Vision Document - Details about the project producing the Moraliife software product.
- Project Plan - Details about the time lines driving the development of the project.
- Use Case Documents - Details about the use cases outlining the software interactions with users.

Product Overview

Moraliife is a morality tracking software that, will act as the User's Digital Conscience. The User will enter in real-life choices, and the software will tabulate and visualize the aggregate of these choices over time. Moral and immoral classifications will be based upon the real-life religion or philosophy with which the user has chosen to align him/herself.

The software can be utilized as either a personal statistics tracking application in the model of other weight, finance or decision tracking software, or it can also be utilized in a leisure facility by the customization and socialization of the User's Conscience.

User Experience

A basic Use Case allows a User to quickly enter in a choice that he or she has made in real life. This is the primary day-to-day interaction with the User after a User has setup a profile.

- System presents initial screen showing current statistics.
- User wishes to enter in a “good” or “bad” deed.
- User enters in supporting data via text boxes and system-generated lists and chooses how “good” or “bad” the Choice was via sliding scale.
- System tabulates data and calculates delta to User's “Moral Grade”.

The software will also fulfill secondary, more complex Use Cases.

- User wishes to contemplate the consequences of an Choice he/she is about to take or wishes to reflect on an Choice they have already committed.
- User wishes to see how their Moral makeup is progressing.
- User wishes to research philosophical or religious texts, places, figures or beliefs.
- User interacts with their Conscience.



Assumptions

Given the nature of the data entry, the entire system will be based upon an honor system with the assumption that the user will honestly wish to track his/her own choices. Additionally, the user will be able to enter justifications and consequences of actions, in a simple manner to weigh the possible advantages and disadvantages of a choice. Milestones and reporting profiles will be available to the User in order to track his/her moral progress. Given the propensity of other applications asking for unflattering information from their Users, this assumption seems minimal.

To emphasize the leisurely nature of the software, the user will be represented by a visualization known as a *Conscience* and will have a limited ability to customize this visualization. It is assumed that the User will want to interact with this Conscience and affect its demeanor and appearance by completing goals inherent to the software. This Conscience will be somewhat anthropomorphized such that it will react with a degree of humanity to inputs of the users morality choices. The Conscience will change depending upon the moral vector that becomes more defined as well as the relative age of the Conscience as the user inputs choices.

Software Vision

The scope of this software will be to release a client program that will allow the Users to chose a representation for themselves, enter in choices that they have to make, amend these choices, set a Moral Grade Goal, research the belief with which they've chosen to align themselves, view reports on their own ethical progress, export and import this information and customize their Conscience.

Subsequent releases will follow two paths:

- Client feature-set improvement and quality control.
- Development on other platforms.
- MoralWorld Server model to facilitate additional functionality:
 - Account synchronization between clients that are allowed Internet access
 - Multiplayer functionality
 - Socialization integration into networks such as Facebook®, Twitter® and other such products in the intention of allowing other people to compare each others' Consciences.
 - Collect morality data (at the User's permission) and aggregate this information based upon geographic location as well as present this Moral Compass to either client users or web users showing overall moral direction of a geographic region.

Technical Vision

This section will outline high-level design decisions that will drive the development effort.

The primary technological purpose of the software will be to provide the User as efficient and compelling a mechanism to enter in ethical decisions as possible. Subsequent releases will focus on creating as many vectors for data entry as possible such that, that the software must exist on as many platforms that make sense.

The primary system will be built using Objective-C and SQLite as the fundamental languages and data repositories. Cocoa, Cocoa Touch and Core Data will be the frameworks for the initial development efforts.

The technical basis of the product will be to utilize as much Free and Open Source software as

possible. In the case of utilization of licensed software, BSD-style and public domain licensed software will be adhered to as much as possible.

The production code base of Moraliife will be written in Objective-C and ported to other languages where applicable. The design methodology will be Object Oriented and Model, View, Controller (MVC).

Model/Data – SQLite will be utilized for data storage within the application. Core Data will provide the framework to access the data. The Model will be completely abstracted from the View as the desire to port the software to different platforms is paramount.

View/User Interface – UIKit and Core Animation will be utilized for the default user interface of the iPhone platform, while a more advanced OpenGL-based graphical user interface will be provided for higher level platforms. The View will interact only with the Controller when attempting to read or modify the Model.

Controller/Business Logic – The framework to house the business logic will be constructed. No free, open-source or licensed frameworks available today fit the primary deliverables of the software.

Initial target platforms include:

- iPhone – Objective-C codebase, SQLite database, Foundation framework for additional language features, Core Data database framework for data manipulation, OpenGL ES/Quartz/ Core Animation for the user interface

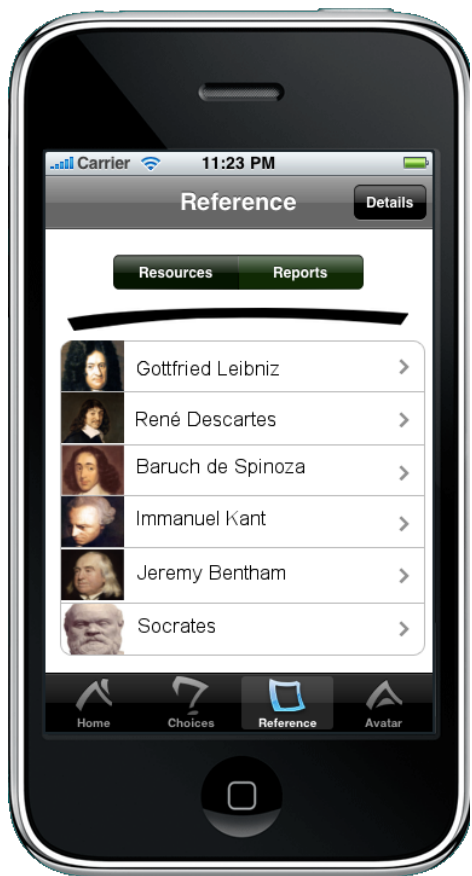
Subsequent target platforms include:

- iPad – proprietary port based upon Objective-C. Initial iPhone product will port to iPad by nature of the development environment, but an iPad native application will be pursued to account for the differences in user experience between the devices.
- Subsequent Ports – C++ and codebases, user interface available as either pdcurses for the cli or OpenGL for X11 UNIX,
- POSIX-compliant, GNU/Linux – C++ codebase, SQLite database, user interface available as either pdcurses for the command line interface (cli)
- OS X (Intel based) – proprietary port based upon Objective-C
- Windows – C++ codebase, user interface available as OpenGL
- Facebook – proprietary port based upon AJAX
- Android/Blackberry – Java port

Licensing

The licensing for the source code of Moraliife has yet to be determined. As such, the requirement for asset acquisition is that public domain assets should be sought as much as possible in order to comply with whatever licensing model is ultimately chosen for the project. This is to ensure that no licensing conflicts exist between the product as a whole and any external assets that the product may use.

To that end, the licensing status of every external asset contained in the product can be found in the Moraliife Asset Licensing document.



Project Methodology

The project will utilize the Open Unified Process to manage the tasks necessary for completion. The Project Plan entails the four phases of the project: Inception, Elaboration, Construction and Transition.

- Inception – This phase will determine feasibility, time lines, target platforms, knowledge acquisition, high-level design, initial requirements and initial Use Cases.

- Elaboration – The research in the Inception phase will be collected into the Project Plan, Use Cases, Data and Object Models and Visual Designs. Usability will be performed on rough visual prototypes based on the initial Use Cases. These resources will be used to construct a functional prototype of the software.

- Construction – The prototype completed in the Elaboration stage will be adapted into the development code base and be promoted through Alpha, Beta and Release Candidate phases. A rudimentary marketing plan will be developed during this phase as well.

- Transition – The final Release Candidate will be prepared for the various delivery vehicles and User documentation will be completed. The Support Infrastructure will be completed as well.

The project will heavily rely on documentation to strengthen the vision of the software. The project will produce Use Cases for every interaction between the User and the System and the System's responses to User interaction. See the Moraliife Project Plan for phase and task time lines and completion percentages.

Requirements Gathering

As this software is attempting to create a market segment, there are no peers with which to compare functionality. However, adjacent market segments were investigated and the following functionalities were deemed useful to the user communities of those market segments.

- Journal Entry – The ability to enter in thoughts towards choices and goals and the ability to take User entries and process them into a score
- Reference and Reporting – The ability to see progress towards goals in a variety of methods
- Constant, Positive Feedback Loop – The idea that a User should be rewarded for utilizing the software in even the most rudimentary way
 - The User should become accustomed to being rewarded in some small way nearly every time he/she uses the software.
 - The User should also begin to anticipate that the next sizeable reward requires completion of only a trivial set of tasks which will drive them towards their next milestone.

Feature Set

Given the information gathered during market research, the project team has landed on the following sets of functionality. See Moraliife Use Cases for more information.

- **Conscience Creation** - The User will open the application and be asked a series of general morality questions in regards to their belief system. This series of questions will culminate with the generation of an on-screen, anthropomorphic representation of the user. This entity will lead the User through the initial tutorial and also communicate with him/her whenever the System is utilized.
- **Choice Entry** - Users will be able to enter in morality choices that they make in their day-to-day lives and assign alignment, justifications, affected parties, consequences and hindsight to choices. The System will calculate the User's Moral Grade. The User's Conscience will respond to the aggregate of these entries.
- **Conscience Customization** – The Users will have a limited ability to customize this Conscience. They will be able to alter the Consciences appearance as well as procure “accessories” to embellish the Conscience with regular use of the software. Regular use will provide the User with in-app monetary units called Ethicals. They will also be able to affect the Conscience's Moral Quality with the Choices they enter as well as the accessories they adorn and Dilemmas that they answer.
- **Reference** – Users will be able to generate reports and graphs outlining their choices and progress towards their Moral Grade Goal. Also, the User will be able to see what the System possesses as reference figures and texts. The User will be able to simply note if he/she has familiarized him/herself with these entries.
- **Goal Tracking** – Users will be able to set a Moral Grade Goal and attempt to match his/her own Moral Grade to that Goal. The User's Moral Grade will be the ratio between their positive Moral Entries and their Total Entries.

One of the most important distinctions that a User can define for themselves as far as the software is concerned is the selection of their Belief. As the software does not presume to judge one belief system over another, morality quantification is based upon one of the Belief systems known to the System.

User Analysis

The software will target the private sector. As such, the technological savvy of the User will be assumed to be low. However, more technically capable Users will be offered higher functions and more complex interactions as well.

A target User of the Moraliife software product would possess the following aspects:

1. Desire to improve one's self
2. Technical ability of a level to do basic data entry into a system
3. Tenacity to fulfill a goal set in advance
4. Inquisitiveness to interact with the software on a deeper level than provided in the basic functionality
5. Possessing sufficient empathy of humanity

Information Architecture

The primary information asset of the software is the tabulated data of the various world religions and philosophies as well as their accompanying subject matter. This data set is extensive and as such, it must be organized intelligently and completely. If the User wishes to familiarize him/herself with an unfamiliar religion or philosophy, the software will allow this through its Reference and Reporting functionality.

The Information Architecture is as follows:

- Conscience Tables – Information pertaining to the Conscience's visualization, accessories, disposition and progress
- User Tables – Information pertaining to the User's moral choices, custom beliefs, values, Milestones and affiliations
- System Tables – World belief data divided into philosophies, religions, texts, places and figures.

Prototyping

Development of the software will progress through several stages. Along the way, various prototypes of both complete functionality and deep-dive functional concepts will be constructed. These prototypes will be available on one mobile platform.

- Visual Prototypes – Screen captures of UI elements gathered and arranged into mock User Interfaces. A rudimentary visual design will be present in these initial prototypes. Usability will be conducted upon these Visual Prototypes.
- Functional Prototypes – Actual executable code running on simulators and development devices to allow actual user interaction in order to test program integrity and user interactions.

Usability Testing

Outside resources for usability and human factors will be sought out as it is impossible to implement such project deliverables with the limited staff of the core design team.

At most, a usability study on software prototypes will be conducted by said resource before construction phase. Full usability testing sessions might be pursued dependent upon the outcome of these initial usability studies.

Specifically, the procurement of usability resources must take place in the elaboration phase and conclude in such time as to give adequate time and focus for the development team to implement whatever decisions are made by the usability focus. These requirements are neither optional nor trivial to the success of the project.

Data Design

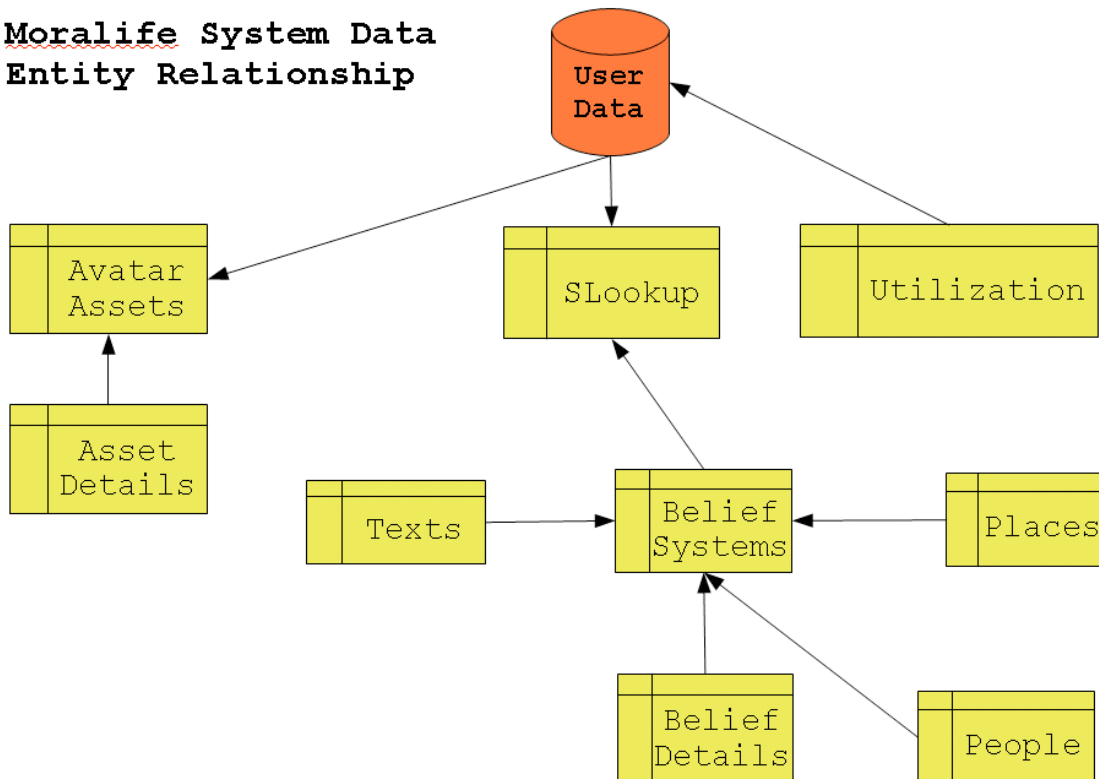
This section will detail the specifics of the back-end data structures which house the Users' information. The software will rely upon a relational database system which houses two sets of data: System and User data. Additionally, System Data is further divided into Reference Material and Conscience tabulation.

System-Conscience Data

The Conscience houses its information in the System data tier.

- 1 Conscience – The basic Conscience information once the User has configured the System for the first time
- 2 Possessions – Once the Conscience has completed some Milestones, the System will reward the User with things with which to customize the Conscience.

Moralife System Data Entity Relationship



System-Reference Data

This is the data integral to the system which contains:

- 3 Belief Systems – The moral systems which contextualize the morality choices entered into the system.
- 4 Canonical Texts – References to literature which outline moral structure of each belief system for reference by the User.
- 5 Significant Places – Location data of sites significant to the beliefs.
- 6 Belief Implementation Details – Belief-specific ideals, thoughts, statements, commandments which reference the previously listed tables for specifics.

- 7 Utilization Data – Information abstracted from the User which tabulates system-use frequency and calculation of metrics from user-entered data.
- 8 System Look-up – Shared information tabled once and referenced by all other tables to ensure normalization of recurring data.

Example Belief Data

The belief systems that the software will support will be divided into two paths: religion and philosophy. If a User wishes to familiarize themselves more intimately with either their chosen belief or any other belief known to the System, he/she will be able to read about people, places and texts important to those beliefs.

Name: Roman Catholicism

Type: Religion Deity(ies): God, Jesus Christ, Holy Spirit

Parent: Christianity

Important Figures: Mary of Nazareth, Thomas Aquinas, etc.

Important Texts: The Old and New Testaments

Important Places: Cristo-Rei, Lisbon Portugal, 38.678611:-9.171389

Theme: There is no God, but God.

Virtue	Vice	Definition
Chastity	Lust	Sexual conduct
Temperance	Gluttony	Asset utilization
Charity	Greed	Generosity
Diligence	Sloth	Work ethic
Patience	Wrath	Conflict Resolution
Kindness	Envy	Perception of others
Humility	Pride	Importance of Self

Name: Nihilism

Type: Philosophy Originators: Jacobi, Kierkegaard, Nietzsche

Parent: None

Important Figures: Turgenev, Heidegger, Kafka, etc.

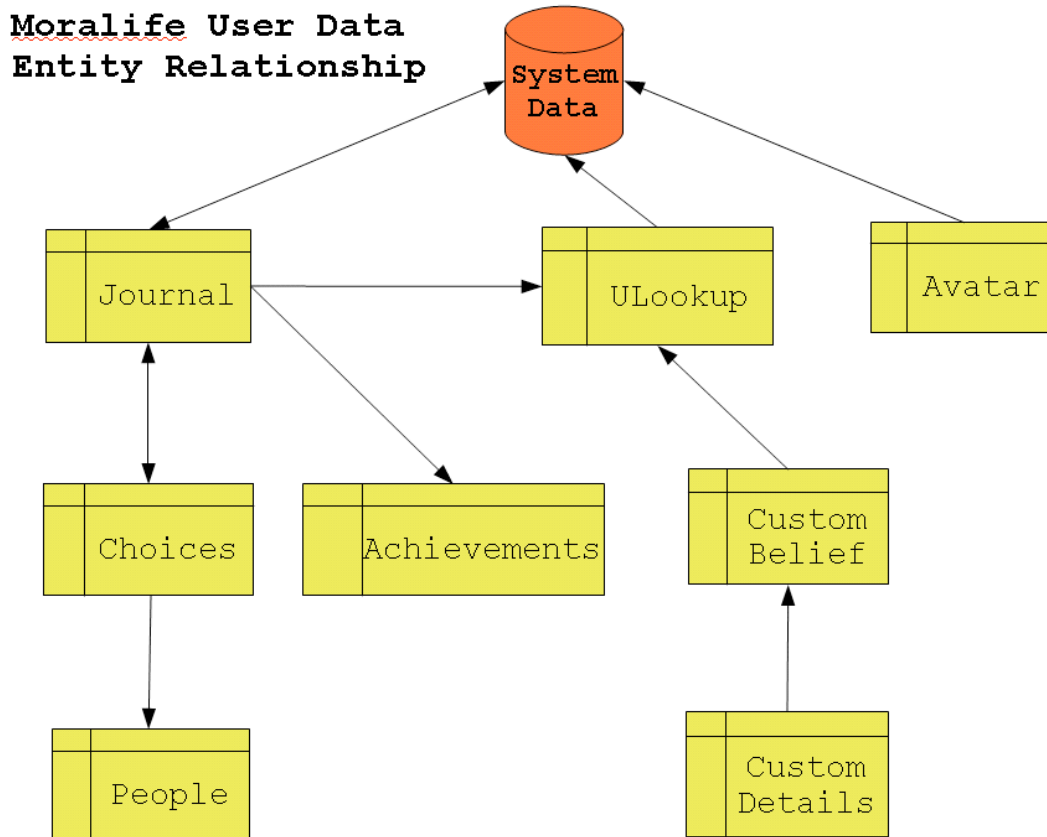
Important Texts: Fathers and Sons, Beyond Good and Evil

Important Places: Nietzsche House, Sils-Maria Switzerland

Theme: Reality is subjective.

Virtue	Vice	Definition
Source Internal	Source External	Origin of morality
Objectivity	Subjectivity	Perception of morality

User Data



This is data entered by the User and utilized to generate the Conscience and house the User's day-to-day Choices and interactions with the System.

1. Conscience – The Conscience retains the effect of Choices and actions taken by the User and continually evolves based upon this data.
2. Milestones – Milestones that the User has passed
3. Morality Entries – The primary table that will house the required data for entering in a Choice.
4. Journal Entries – The User has the option of recording more specific information on a given Choice and will have the ability of exporting this data to other systems.
5. Custom Beliefs – The User has the opportunity to define a Custom Belief system if the ones the System supplied are not applicable.
6. Custom Details – The User can also outline custom details for their Custom Belief if they choose to do so.
7. User Look-up - Shared information tabled once and referenced by all other tables to ensure normalization of recurring data.

Reference Data

The system will ship with reference data for a subset of popular world religions and philosophies. Each belief will have supporting figures, texts, places and belief details.

The initial Parent Religions are: Buddhism, Christianity, Dàoism, Free Masonry, Hinduism, Islam, Jainism, Judaism, Shinto, Sikhism and Universal Unitarianism.

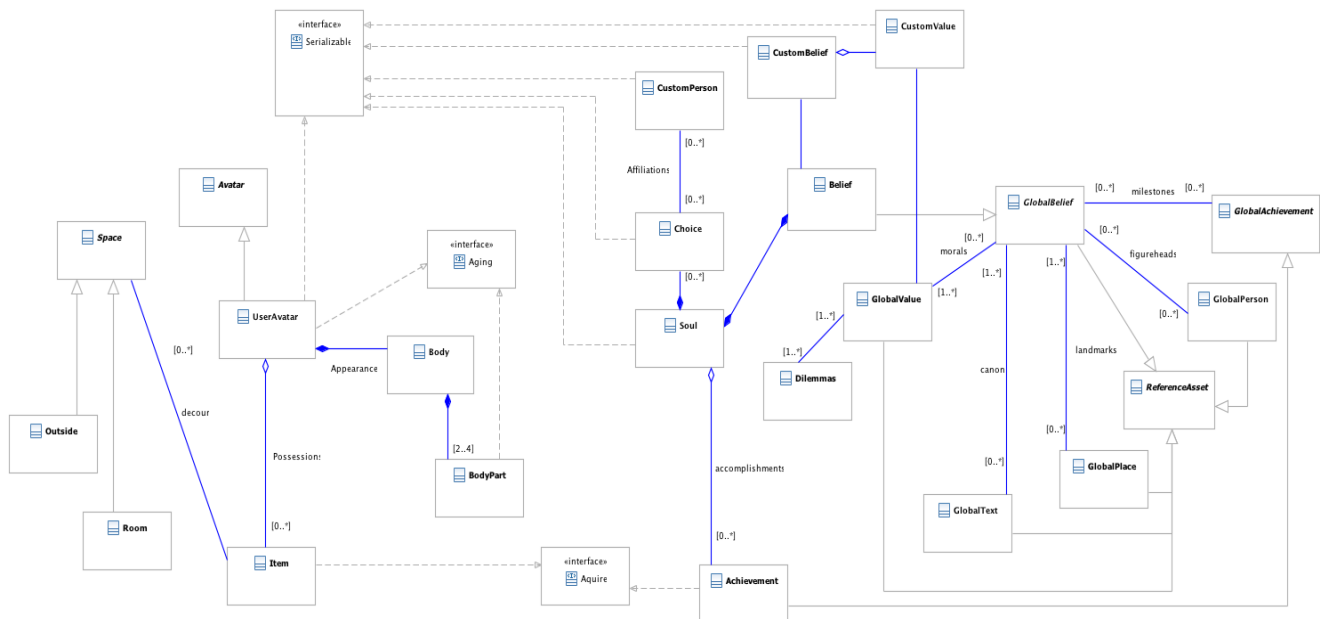
The initial Specific Religions are: Mayahana, Theravada, Vajrayana and Tibetan Buddhism (Lamaism), Adventism, Anglicanism, Baptism, Eastern Orthodox, Lutheran, Methodist, Penecostal, Protestantism, Latter-day Saints, Jehovah's Witnesses, Roman Catholicism, Quakers and Unitarianism Christianity, Vaishnavism, Shaivism, Smartism and Shaktism Hinduism, Shia and Sunni Islam, Orthodox, Conservative and Reform Judaism, Svet Ambara and Dig Ambara Jainism.

In general, it is difficult to categorize philosophies in parent-child relationships, so the initial Philosophies are: Agnosticism, Altruism, Atheism, Confucianism, Conservatism, Egoism, Empiricism, Existentialism, Fatalism, Hedonism, Humanism, Idealism, Liberalism, Nihilism, Objectivism, Pragmatism, Rationalism, Stoicism, Taoism, Thirteen Virtues, Transcendentalism, and Utilitarianism.

For every belief, there will be at least one canonical text available as well as at least one figurehead with appropriate high-level information available for the User. Additionally, every religious belief will have at least two Conscience visualizations available and an equal number of secular icons will be available as well.

Architecture Design

This section will outline the architecture of the software in how the data is manipulated by the program.



The software will be heavily object-oriented and be developed in a general MVC methodology. No rigid software architecture methodology will be followed as none are suited to the extremely small development team and desired platform deliverables.

Domain Model

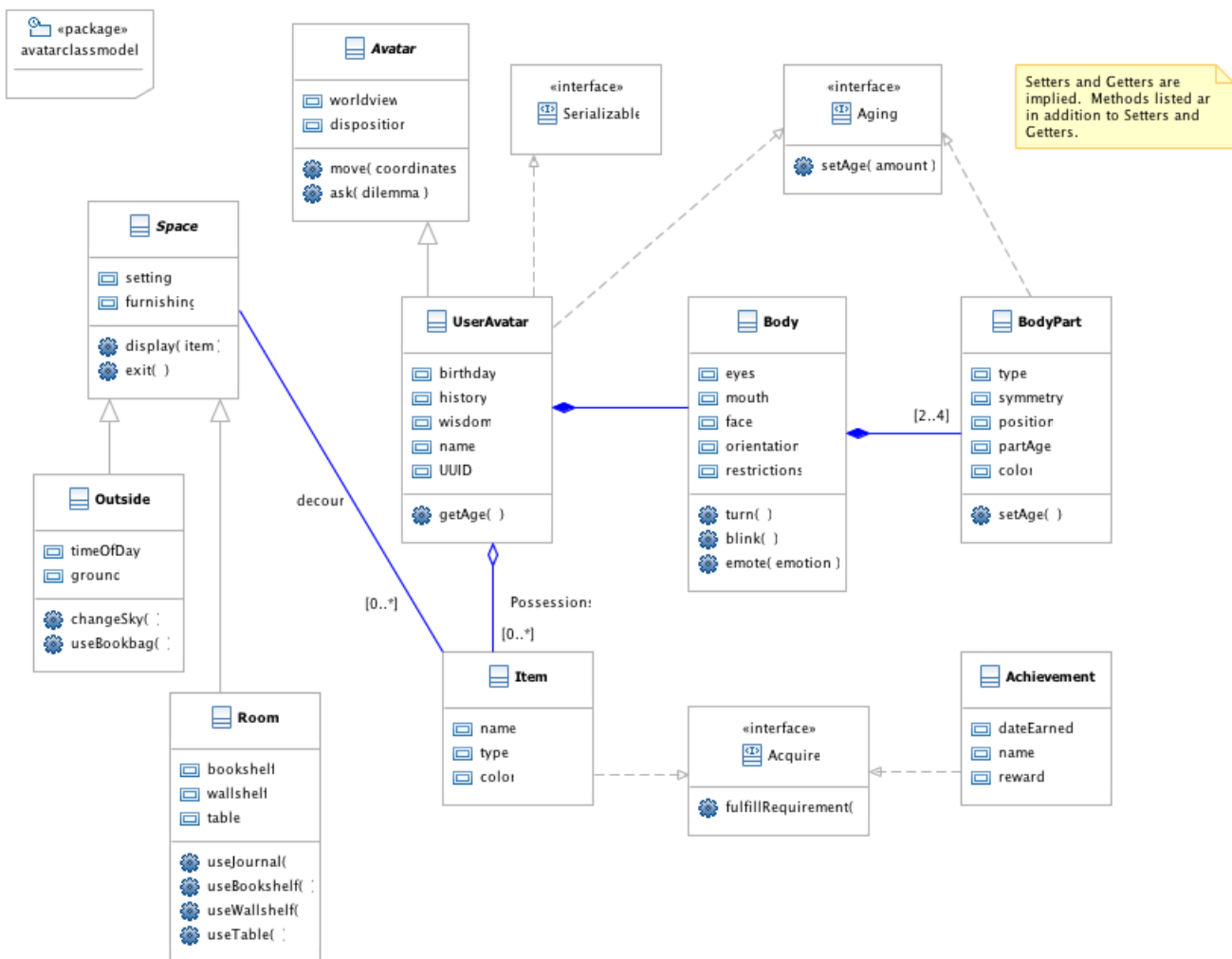
The domain is divided into three tiers:

- The Conscience Tier – This section of the domain outlines the objects needed for Conscience creation, disposition, maintenance and progression.
- The User Tier – This tier outlines the User's entries, beliefs and accomplishments. Most of the direct User interaction will involve this tier.
- The Reference Tier – This tier houses the information gathered on the various world religions and philosophies along with their associated texts and figureheads.

Data Protection – The tiers themselves will roughly fall into 3 types of access control.

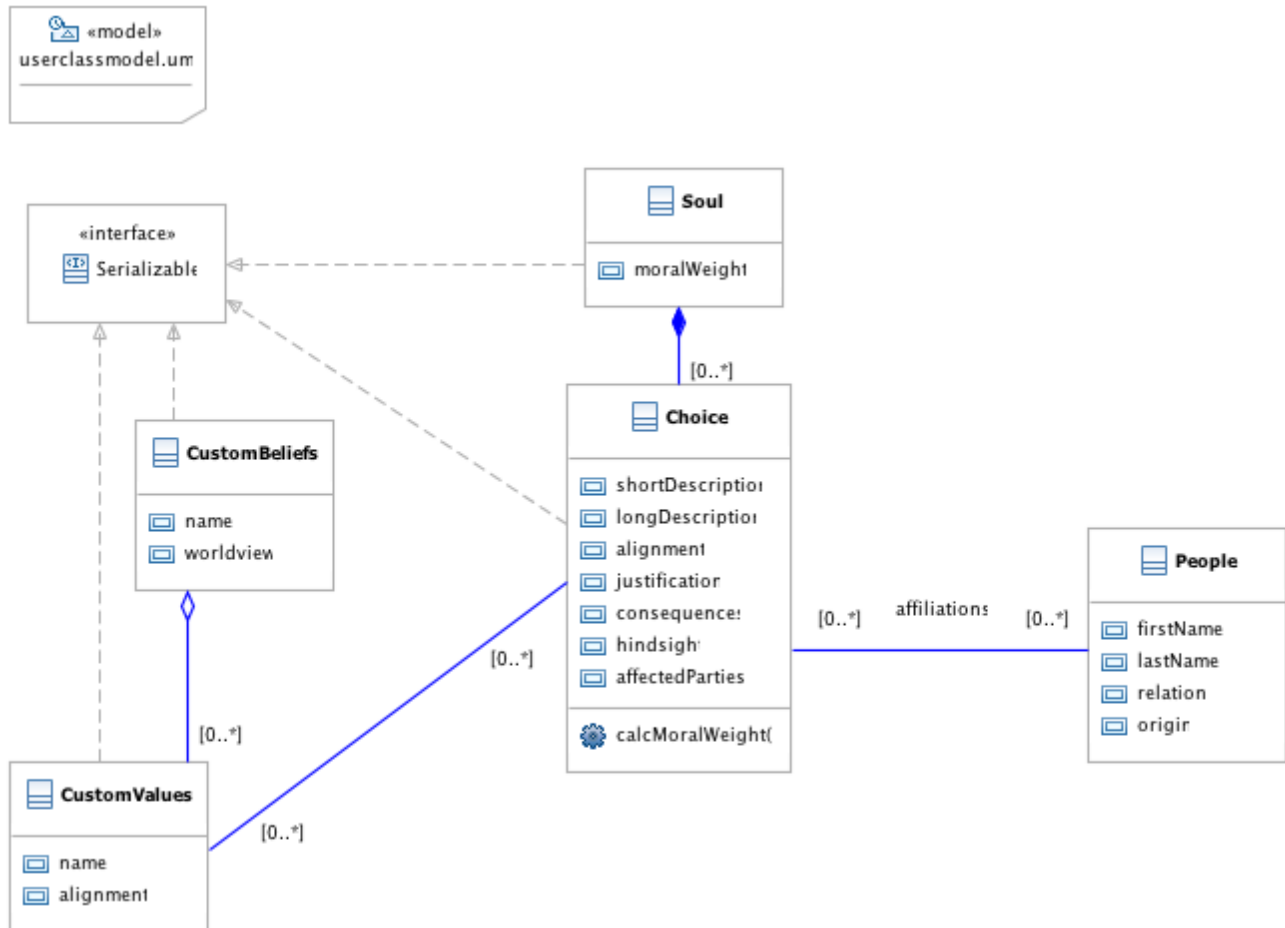
- **Reference** – Data will mostly reside as read-only.
- **User** – Data will be mostly read-write, and directly entered by User.
- **Conscience** – Data will be mostly read-write and derived from data from the other two tiers.

Conscience Tier



The Conscience Tier of the model defines the User's Conscience. The objects in this tier will generally derive their functionality from data in the other 2 tiers. As the Conscience can change over time, it will be necessary to house these changes separate from the other two tiers.

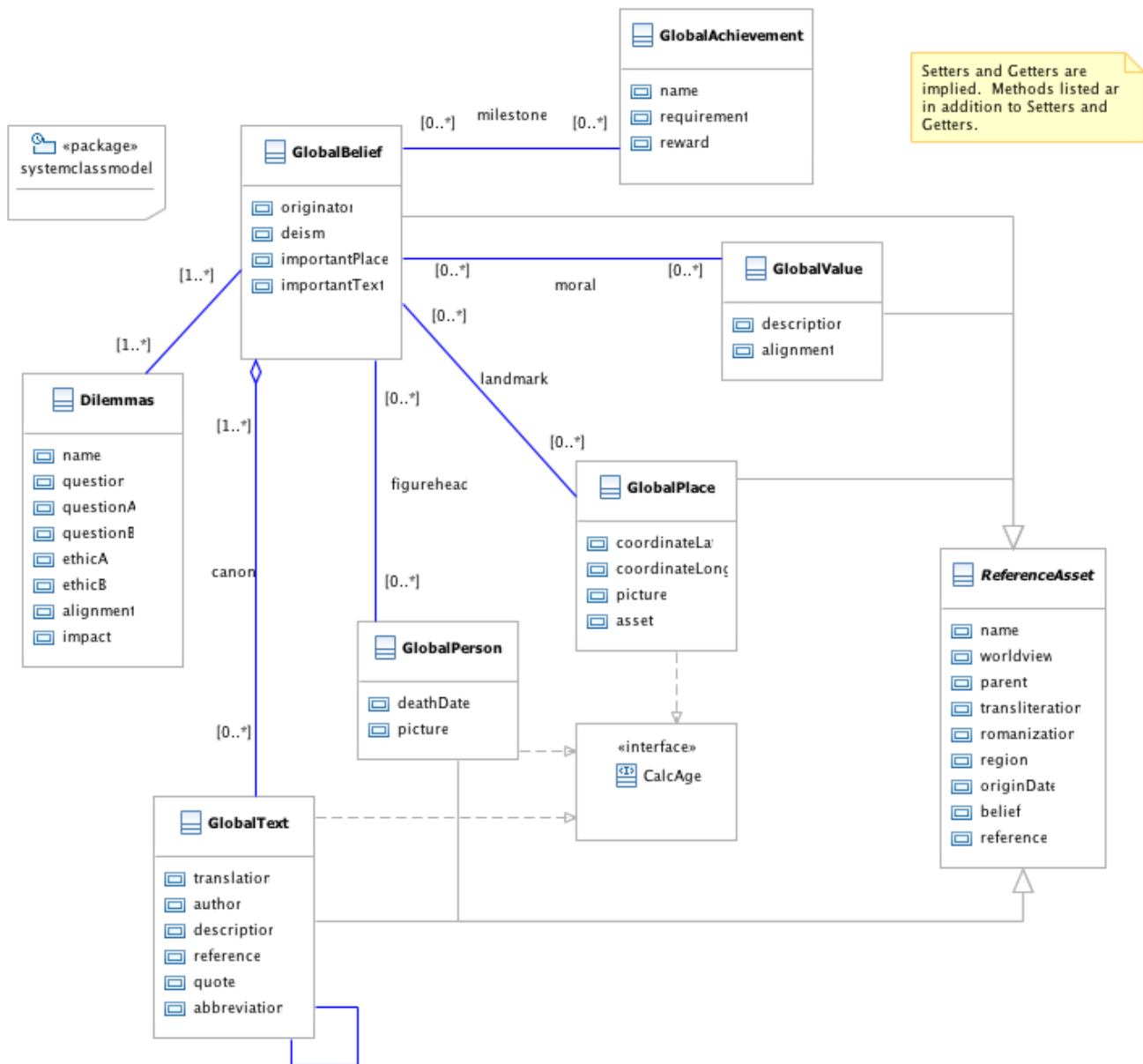
User Tier



The User Tier will most directly interface with the User, while there is derivation taking place in this tier, a majority of the data here will be directly entered by the User.

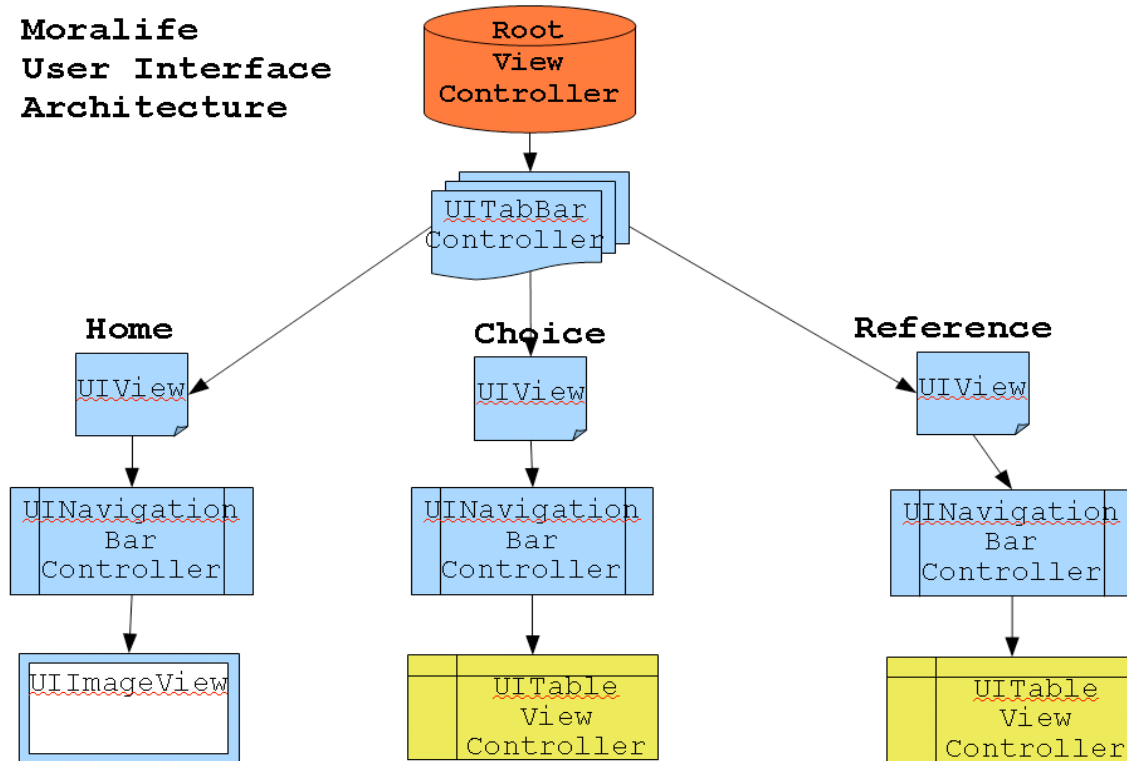
Reference Tier

The Reference Tier will house the data and objects that ship with the System and exist independent of the other two tiers. This tier will help shape functionalities from the other two tiers.



Interface Architecture

The architecture that drives the navigation is composed of several discrete views and associated controllers. These classes provide both primary and secondary navigation.



The **UITabBarController** is a stack of **UIView**s that provide the actual screens for the four primary sections. Within the first three sections a **UINavigationController** controller stack allows for secondary navigation within each section. Additionally, a **UITableViewController** allows the User to interact with the data in a stacked manner.

Visual Design

The design philosophy for the project will be based upon high-contrast, low complexity visuals that will port easily to each visual framework of the target platforms. The artistic approach will be that of calligraphy, line art, and rooms with wooden molding and muted color walls. Objects and concepts will be abstracted to their most basic identifiable details and visualized accordingly.

Conscience visual assets will be housed in the Scaled Vector Graphics (SVG) format to allow for the various scaling that assets will be expected to do for the target platforms. In the case of raster User interface assets, Portal Network Graphics (PNG) format will be used due to the efficiency of the format and the ability to show semi transparent layers. Photography will be housed in Joint Photographic Experts Group (JPEG) due to the need for high-color representation.

Design Metaphor

The overall design metaphor for the System will be that of textured wall under a crown molding.

The System will persist this metaphor in as many interface elements as possible such as push buttons, title and navigation bars, and icons. However, use of System fonts and familiar interface buttons will also be unchanged in order to utilize the mindshare of the User based already being accustomed to many interface interactions.

Typography

The typography has been identified as Helvetica. There are two requirements that drive the adoption of this typeset.

Example:



- Platform Consistency – The iPhone platform has a completely comprehensive style guide that dictates design philosophy of the platform and guidelines that developers should follow. To ensure consistency with the rest of the platform assets, a non-stylized font should be utilized. However, this will impact consistency within the application as most of the graphic assets are of a highly stylized nature based upon a calligraphy metaphor. Regardless, given the desire to promote a professionally and thoughtfully designed product, the choice of Helvetica is obvious.
- Portability – Given that a variety of platforms are targeted for eventual support, finding a font that will exist on all of these would significantly increase portability. While Helvetica is noticeably absent on the Windows platforms, there are numerous alternatives available as part of the Windows system.

The quick brown fox jumped over the lazy dog.
THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG.
1+2+3+4+5+7+8=9+8+7+6+0

The initial requirement is that the font families selected are available on as many target platforms as possible. Additionally, all typography must be Unicode to account for the various languages that the software must support (e.g. Sanskrit, Mandarin, etc.).

There is one requirement that is not met by the choice of Helvetica, however.

- Software Consistency – The visual philosophy driving art assets evokes a stylized, hand-drawn, script visualization. To continue the calligraphy metaphor, a highly-stylized, serif font would be best to complement this design choice. The Apple Chancery font is well suited to meet this requirement, but its proprietary nature makes its selection problematic. Additionally, the intricacy of the font makes it difficult to read in some scenarios.

As such, there must be a conscious effort made to provide a visually pleasing integration of platform-generated text and system-generated visuals.

Palette

Color palette will consist of various wooden, parchment and earth tones.

Conscience palettes will be more strict such that all visual designs must function in both full color and two color representations. For this reason, all initial visual design is conducted in two-color.

Conscience accessories will be full color and should be recognizable purely by their silhouettes. Additionally, most images must be discernible and visually pleasing at both small size (64x64 pixels) and large (480x320 pixels). This is to account for being able to utilize art assets for both primary display and secondary display in the cases of selection lists as well as lower quality screens.

Assets

The project will manage two types of visual assets depending upon the origin of the asset. Vector graphics in the form of scaled vector graphic (SVG) will be utilized for original assets created for Moralife, while portable network graphics (PNG) and Joint Photographic Experts Group (JPG) will be utilized as the compression scheme for raster, pre-existing, public domain art assets as well as interface elements.

The original assets will be vector-based given the low complexity and high reuse requirements such that a mouth art asset will need to be scaled, rotated and colored depending on the need. The public domain assets will be raster and PNG compressed given the both licensing model available on PNG compression and the performance of rendering PNG files on the target platform. JPG will be used when high-quality raster is necessary.

Conscience

The Conscience is the central visual asset of the software such that most of the User's visual attachment should center on the Conscience's visualization.

Christianity



Islam



The Conscience is composed of several structures all meant to communicate separate ideas. Each structure is a programmatically assigned feature. The Conscience itself is a composition of discrete objects, rather than a complete object.

Composition

1. The “body” of the Conscience itself is composed of a highly stylized version of common icons of philosophical, religious or secular ideas. In the cases above, a Christian crucifix and an Islamic crescent and star attempt to evoke several ideas.
 - The cross implies the face structures such as brow, nose and forehead. The crescent implies the cranium or hairstyle while the star fulfills the role of right eye.
2. The “eyes” of the Conscience will attempt to communicate the Conscience's age, stress level and liveliness. While some subtle gender cues are present, the Conscience is never given a gender. Stress lines, bags, crows feet, pupil dilation, blinking and other visual cues will appear given information provided by the User and the System.
3. The “mouth” of the Conscience will primarily communicate the Conscience's disposition. The mouth is capable of displaying various stages of laughter, sadness, joviality, stress, discontent, etc. by frowning, sticking out its tongue, yelling, yawning, etc.



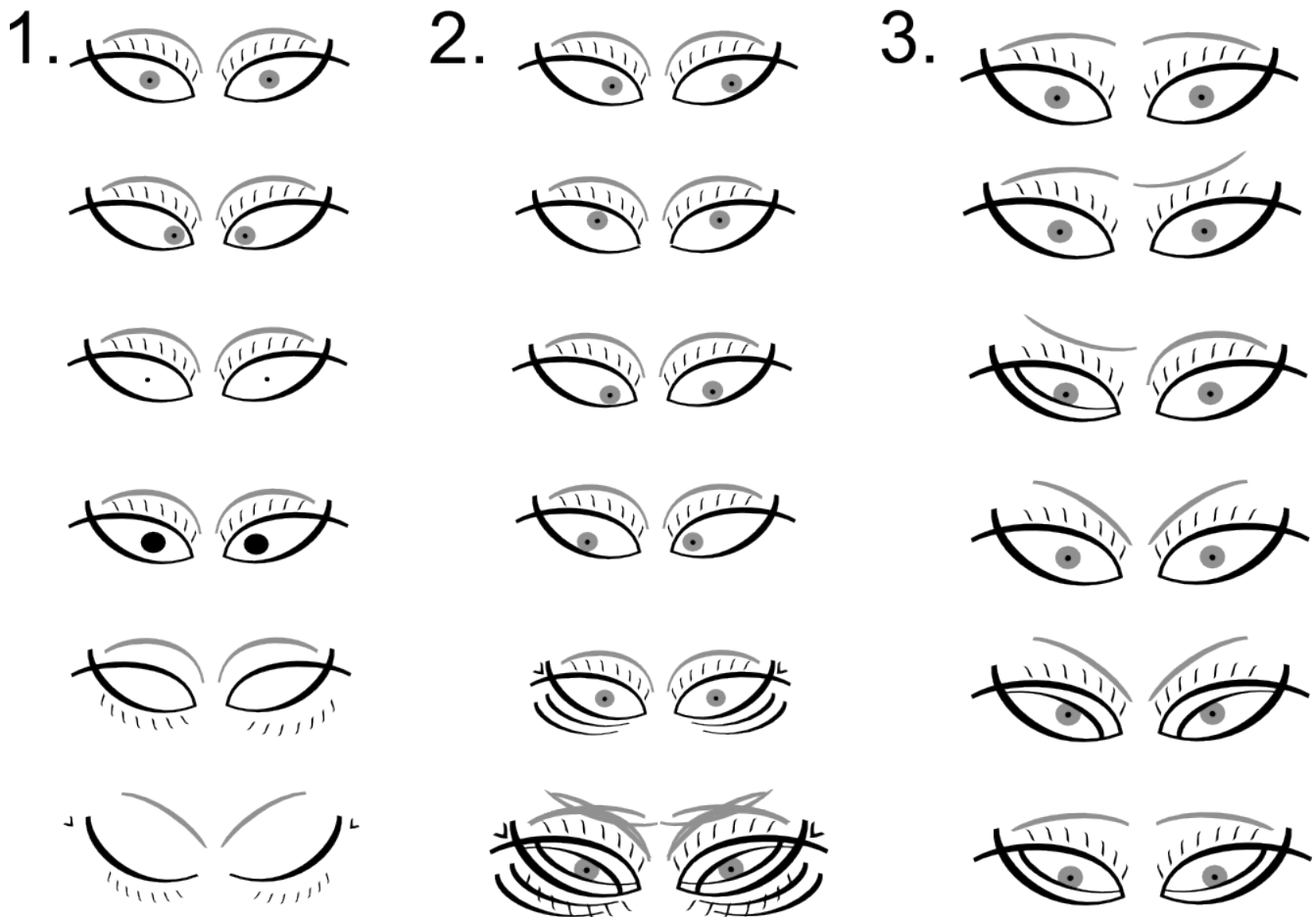
Expression

The Conscience's Disposition will be communicated to the User via the Conscience's eyes and mouth. In regards to the eyes, the System is capable of displaying a wide variety of emotions and states using combinations of placements of the eyelids, eyebrows, lashes, pupil and iris. Alone, the eyes are able to communicate specific things given the placement of these assets. When combined with the mouth, the Conscience becomes extremely expressive.

The Conscience is also contained within an animated bubble which serves to separate the Conscience from the background, define a bounds to the Conscience's being upon which to attach accessories and provide additional avenues of communication and customizations to the User (such as the speed at which the bubble pulsates to display the Conscience's enthusiasm).

Subset of Shipping Conscience Eye Configurations:

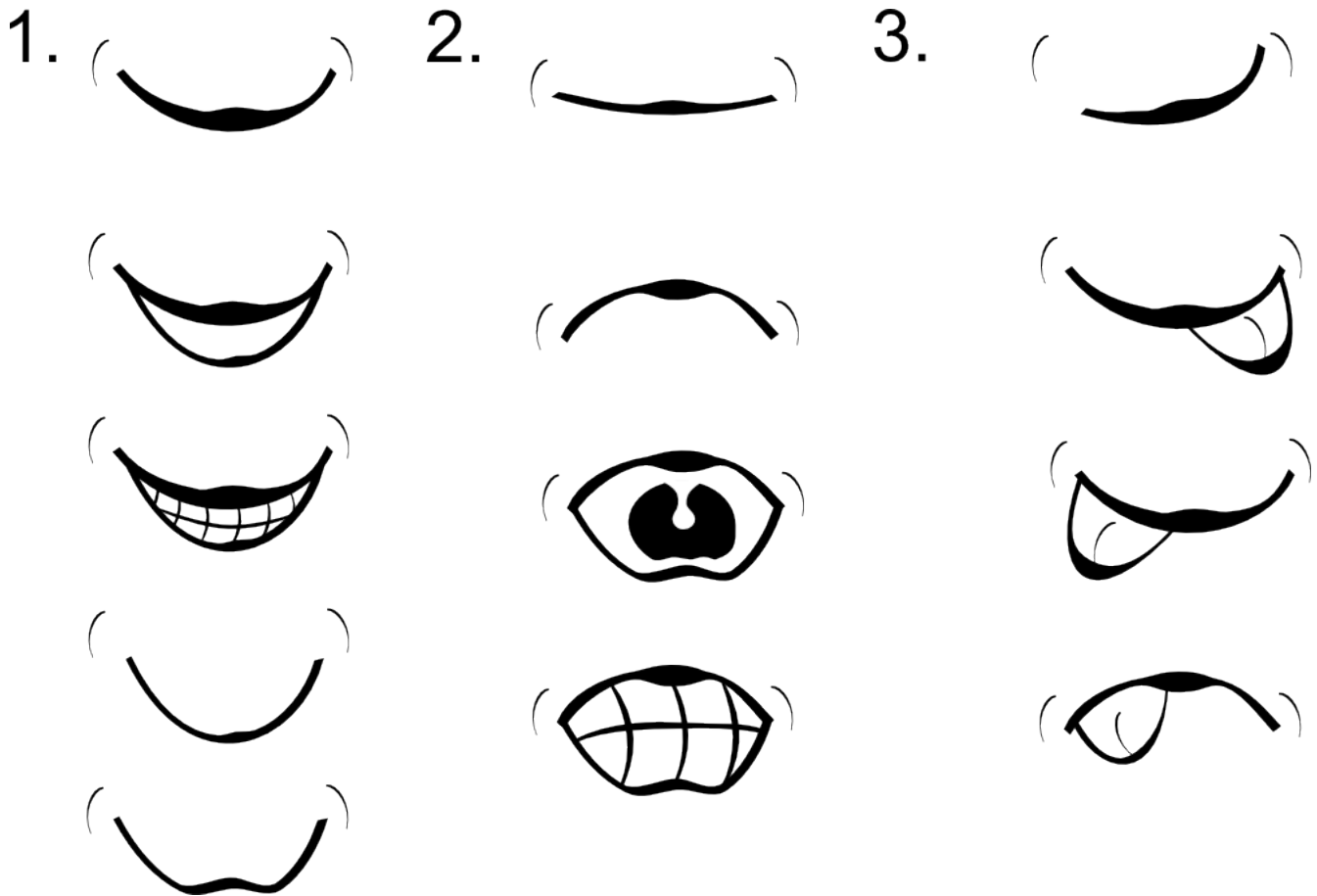
1. **Pupil and Iris Type** – The Conscience has control over its own eye at the level of the iris and pupil. These differentiations, placements and dilations allow the Conscience to communicate enthusiasm, alertness and confusion. Lack of a pupil or iris denotes blinking or squinting.
2. **Pupil and Iris Placement** – The Conscience can also control where it is looking. The Conscience's focus can be on whatever the User is doing, or perhaps a feature of the System that has changed such as the Moral Grade or a new Accessory.
3. **Brow and Eyelid Placement** – The brow and lids are very effective in communicating mood without even having to include a mouth. A Conscience can communicate different levels of confusion, frustration, elation and contentment with simple arrangements.



The Conscience's mouth will work in concert with the eyes to deepen the level of expression available to the Conscience. The System requires a complex system of expression with multiple vectors of actuation due to the fact that repeated views of the same expression from a User will tend to desensitize the User to the Conscience.

Subset of Shipping Conscience Mouth Configurations:

1. **Happiness** – The Conscience will be able to express happiness in a variety of expressions.
2. **Sadness** – Likewise, the Conscience is capable of displaying a variety expressions of unhappiness.
3. **Complexity** – The Conscience will also be able to express playfulness and disgust using its tongue and more complex configurations of its mouth.



While the Conscience will have a basic set of expressions needed to communicate a wide variety of emotions, the Conscience itself is still only a 2 dimensional object composed of discrete vector-based images. As such, there is no need to implement either a Facial Animation Coding System or a Facial Modeling Language interpreter as most expressions are discrete and tied uniquely to a User action.

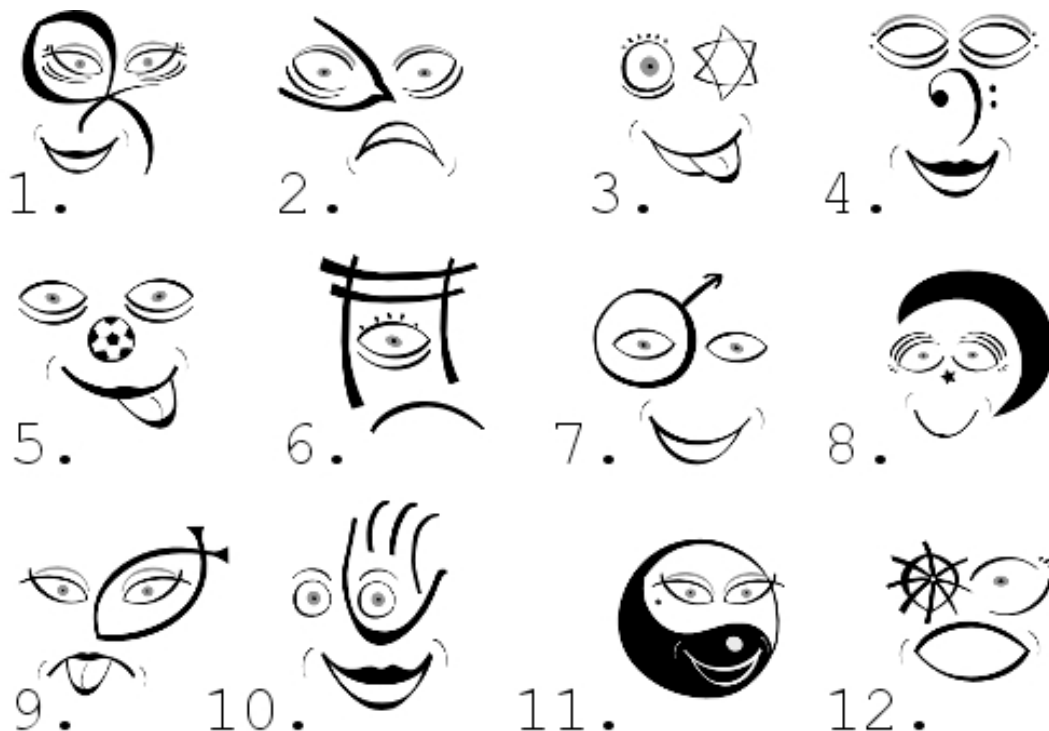
Should the System become more complex and necessitate a more complex Conscience with a distinct AI, the decision to use a pre-existing FACS or FML paradigm will be revisited.

Selection

The User will have a large set of available Conscience type and facial features. Each Conscience will possess the ability to express themselves emotionally. The User's moral inputs will drive these emotional outbursts. The User must feel compelled to find a Conscience with which he/she will be able to identify.

For this reason, the range of Conscience selections must be diverse. If the User cannot find a Conscience with which to bond, then the desire to input morality choices must come completely from the User's initiative. One of the core requirements for the software is to provide a positive and constant set of feedback to entice the User to continually enter in morality choices. While some of the Consciences are unlocked at the beginning of the System utilization, the User is able to earn Ethicals (the monetary and performance units of measure) towards the purchase of additional Consciences, body parts and accessories.

Subset of Shipping Conscience Compositions:



1. Ankh – Conscience is an Egyptian Ankh. Eyes are feminine and imply an older Conscience with bags and crow's feet. Conscience is currently content as implied by a smiling mouth.
2. Falcon – Conscience is a falcon. Nose is implied by the symbol. Eyes are masculine and imply an older Conscience with bags, but without crow's feet. Conscience is aghast.
3. Star of David – Conscience is a Jewish Star of David. The Conscience is amused.
4. Bass Clef – Conscience is a Bass Clef. Eyes are feminine. Conscience is blinking.
5. Soccer ball – Conscience is a soccer ball.
6. Torii – Conscience is a Shinto Torii. The Torii Conscience only supports one eye. The

masculine eye implies average age. The Conscience is slightly upset.

7. Gender - Conscience is a male gender symbol. Eyes are young.
8. Crescent – Conscience is a Islamic Crescent and Star. The star itself can scale to signify an eye, a beauty mark or in this case, a nose. Eyes are kindly and ancient.
9. Ichthus – Conscience is a Christian Ichthus. The Conscience is young and defiant.
10. Ahimsa – Conscience is a Jainist Ahimsa. The fingers of the hand symbol imply hair.
11. Yin and Yang – Conscience is a Confusciast Yin and Yang. The Yin and Yang has several configurations. The dots in the symbol imply a nose and a beauty mark.
12. Wheel – Conscience is a Buddhist Wheel. Eyes are masculine and of average age as implied by crow's feet. The Conscience is shocked as implied by the large eyes and open, unhappy mouth.

Customization

The User will be given limited ability to customize the Conscience as the User completes milestones in the software. A large amount of customization will be made incrementally available to the User to continue the positive feedback loop of creating moral entries. The milestones will be structured in such a way that the User should be rewarded for almost every use of the software within the familiarization window.



The initial release of the software will provide at least 365 attainable customizations so that each User will be able to have one unique customization made available to them per day as long as they are entering in data. The User will be able to mix and match these customizations.

Given the vector-based nature of the primary art assets, the User will be able to colorize certain aspects of the Conscience in order to personalize it. These accessories will also alter the Conscience's Moral Quality, such that the purchase and adornment of a Top Hat of Wisdom could potentially increase the Conscience's Wisdom Quality whereas a Menorah could increase its Faith.

Subset of Shipping Conscience Accessories:

1. Devil tail, moustache and hair.
2. Clown hat
3. Devil horns and Trident.
4. Beard.
5. Wings and halo
6. Yin and Yang necklace (available from any religious or secular symbol in the software) and a leaf.



1.



2.



3.



4.



5.



6.

Surroundings – Whenever the Conscience asks a dilemma of the User, the System will display a visual representation of the scenario to the User as well as describing it textually. Several landmarks will be available to add an additional level of detail, nuance and possible familiarization for the User.



Interface Design

This section will outline both the internal and external program interfaces and the user interface to the software.

Internal Interfaces

In the initial release, the software will interface with itself in the following manners.

- Read Only System Data – System Data is protected such that no programming interface exists

to write to the System tables. Whatever mutable data needs are fulfilled by the Look-up tables generated by the System once the User generates a Conscience for the first time. Look-up tables are populated directly from the System tables and resource bundles for internationalization of the User Interface.

- Read/Write User Data – User Data tables are mutable such that they are built upon the User successfully creating a Conscience upon initial use or reconfiguration of the system. User Data tables are built from User entry.
- MVC – Since the software is intended for multiple platforms of disparate visualization capabilities, all View interfaces will be completely abstracted from all Model and Controller interfaces. In most cases, View interfaces will be platform specific.

External Interfaces

In the initial phase, the software will have the functionality of exporting all entered User Data to a external source in case of a failure of the software or a move to a different, but supported platform.

In subsequent phases, the software should be able to interface with popular social networking sites (e.g. Facebook, Twitter, Blogspot).

Graphic User Interface

The User Interface will follow the Apple Human Interface Guideline documentation in order to utilize the design metaphors that are inherent to the iPhone system and re-use User interface programming as much as possible.

However, many of these metaphors will not work on other platforms and the User Interface will have to be revisited once the System is ported to another platform.

One of the most obvious signs of a high-value application is a consistent, quick and visually pleasing UI. While visual design will dictate what level of consistency and sophistication the UI achieves, the project team will need to focus on multi-threading the application as much as possible so as to ensure that as many background processes as possible are put on an NSOperationQueue, instead of taking place on a User-facing thread.

Navigation

The application will need to have as little design ornamentation as possible given screen real estate issues inherent to the platform. As such, navigation should be as clear and simple as possible while allowing depth for savvy Users.

Primary - Tab Bar

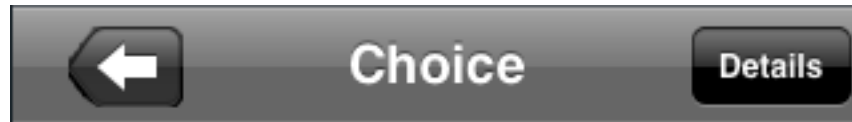
The User will interface with software over a selection of 3 primary sections: Home, Choice and Reference. The primary method of navigation will be a tab bar across the bottom of the screen dictating which sections are available and which section is the current selection. This design pattern of bottom navigation is heavily suggested by Apple Human Interface Guideline Documentation.



The calligraphy Visual Design metaphor will be persistent throughout the entire interface given its placement in the tab bar.

Secondary - Title/Navigation Bar

A title bar across the top of the screen will house the title of the section, a right-side button allowing additional functionality based upon the current section and a context-sensitive back button to allow the User to return to the beginning of the section (not Home).



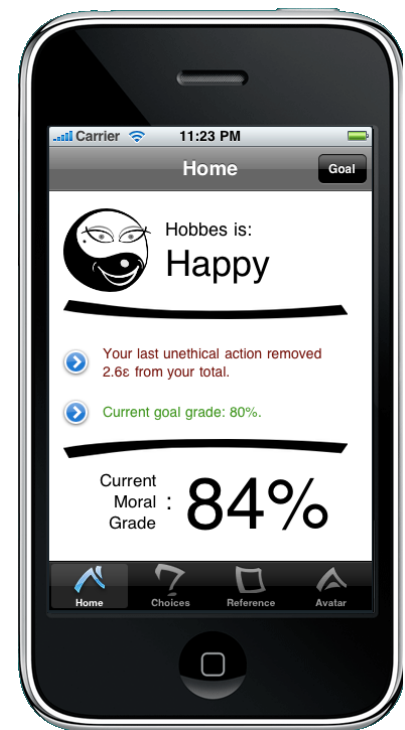
Each section will have further navigation inherent to that particular screen. Each section will be able to navigate directly to other sections where it is applicable. The following mock-ups show the primary utilization of the section and not the complete functionality. To see complete functionality, see Moral Life Use Case documents.

Home

The Home section will display the User's Conscience, its current configuration and disposition and a comment of any goal milestones coming up, reminders and the User's Moral Grade that the Conscience chooses to communicate to the User. Notices of changes in the System can also be communicated in this method.

UI elements:

- Title Bar – Bar indicating User's position in software.
 - Goal Button – Allow the User to set the Moral Grade Goal
- Conscience – Screen section espousing Conscience state.
 - Visual representation – The current Conscience configuration and disposition
- History – Screen Section designating color-coded, User high-level User entries
 - Last Choice – User's last Choice entered, color-coded to affect on Current User's Moral Grade
 - Moral Grade Goal – User-defined, color-coded Goal
- Current Moral Grade – System-calculated percentage from User's entries, prominently displayed.



Choice



The User enter in his/her choices in this section. It also allows the User to return to a Choice to continue weighing alternatives and also expound on actions with things like consequences and justifications.

UI elements:

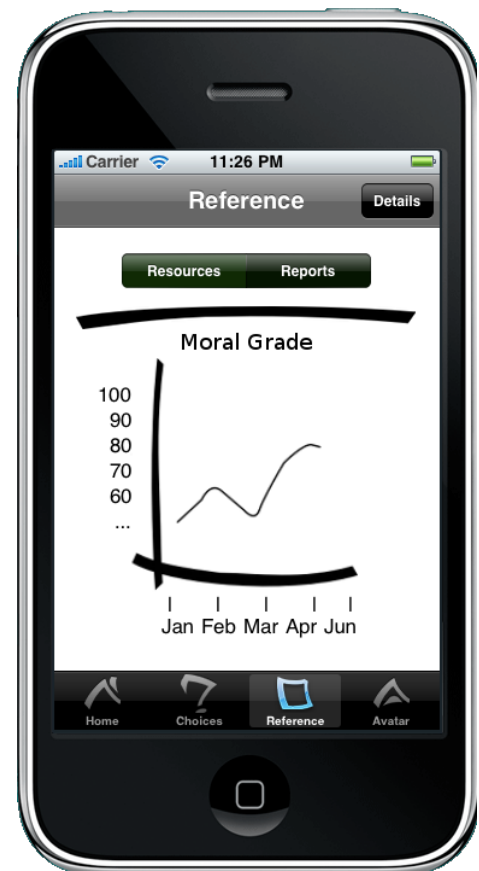
- Title Bar – Bar indicating User's position in software.
- Details Button – Allow the User to set more specific Choice details such as AffiliatedParties, Justifications, Consequences and References.
- Name – ShortDescription field of the Choice
- Alignment – Slider bar indicating User-defined moral alignment (negative to positive from left to right).
- Virtue/Vice Field – Input allowing selection of relevant virtue/vice.
- Remaining Length – Decreasing counter designating how many characters left to enter in LongDescription.
- Description – LongDescription specifically defining the moral Choice.
- Done Button – Button which commits this Choice.

Reference

The Reference section will allow the User to either view the System Reference data on the supplied philosophies and religions or parse all System and User Data available for reports.

UI elements:

- Title Bar – Bar indicating User's position in software.
 - Details Button – Allow the User to set more specific Resource/Report details such as Worldview, Belief, Texts, Places, Figures and Report Type.
- Reference Results – Either a table view listing the Resources available for reading or a graph indicating the requested report.



Conscience Thought

The Conscience Thought screen allows the User to interact with the Conscience via customization, dilemmas and card games. The primary way in which this takes place is that the Conscience asks the User moral dilemmas with a binary answer to which the User must respond. These moral dilemmas will further define the Conscience and the User such that an answer will be weighted for a moral. It is important to make the dilemmas clever enough as to evoke a desire in the User to really consider the alternatives, but at the same time not too subtle as to instill a sense of pretension in the User. Given the desire to make interactions with the software easy and quick, most dilemmas will be false dichotomies such that many responses are valid, but only two are presented.

A dilemma can exist in three forms:



- A question where one positive moral is weighed against another – The User is presented two equally viable options of unrelated moral constitution. As it is difficult to live a completely ethical lifestyle, the purpose of this line of questioning is to make the User decide what their core values are should they be presented with two positive outcomes. It is easy to respond to a question when one of the answers has a negative connotation. It is more compelling to respond to a question where there is not a clearly correct answer.

- A vendor owes your friend money, now long past due. You see the same vendor drop his wallet.

- Honesty - Return the wallet intact.

- Justice - Give your friend the money he owes, first.

- A question where a negative choice is presented of trivial moral weight – The User is given a choice to do a trivial action where the User can act morally or immorally with no real benefit or detriment to any other party. The purpose with this line of dilemmas is to ascertain whether a User will act morally for morality's sake with no other motivation.

- A woman is yelling disrespectfully at a man walking down the street.

- Valor - Confront the woman.

- Cowardice - Go about your business.

- A question where a negative choice is presented of significant moral weight – The User must weigh the consequences of a significant action with two equally viable, but unpleasant alternatives.

- You are stranded on an island with a stranger. Before the stranger dies, he asks to be buried. There is no food on the island, but you can make a fire.

- Honor - Honor the stranger's wishes and bury her, dooming yourself.

- Shame - Canibalize the stranger to ensure your own survival.

The key to these interactions is that the questions and responses are not trivial, nor do they insult the User's intelligence with obvious interactions such as, "Is it moral to steal?" So, while the User's Moral Grade will only be affected positively regardless of the answer, the Conscience's moral disposition will be aligned as well to an affinity to a certain set of morals, such that a User and Conscience can be described by the choices that they make as Compassionate over any other ethic.

However, a User will never receive any negative feedback in answering a dilemma. The act of even considering a dilemma implies moral thinking and no choice will be presented as superior to another.

Conscience Internal

The screen will allow the User to interact with their Conscience in its room. Selecting the Door will navigate the User to Conscience External.

UI elements:

- Reference Results – Either a table view listing the Resources available for reading or a graph indicating the requested report.
- Conscience – The User has a limited ability to personalize the Conscience and provide additional accessories and possessions for it. By clicking on the Conscience itself, the User proceeds to the Conscience Customization section.
- Journal – The Conscience's Journal Section (designated by a Journal open on the Conscience's desk) is a listing of the affects that the User has had on the Conscience.
- Bookshelf – The Conscience's Library section (designated by the Bookshelf in the Conscience's room), the User is capable of selecting it and suggesting texts for the Conscience to read.
- Wallshelf – The Conscience's Possessions Section (designated by a Wall-mounted Shelf in the Conscience's room) allows the User to customize the Conscience's Room and Possessions.



Localization

The software is intended to be usable by any nationality. In time, a translation of the Interface and text resources of the System will be completed for several world languages. The software will be designed with localization in mind, but only English will be supported for the first release. However, all text assets will be housed in localizable programming structures for easy of translation.

Accessibility

The iPhone platform provides an extremely robust infrastructure for supporting Accessibility for Users with a physical or mental disability. Wherever supplied, the software will take advantage of Apple-supplied accessibility functionality by entering in Accessibility data for every interactive or informational field. Accessibility testing will be conducted with the standard Accessibility Inspector available with the Xcode SDK.

Audio Design

The System will provide most of its audio presentation via the built in Apple cues. However, a degree of customized audio design is necessary to provide an extra level of nuance to the UI and Consciences.

Conscience

The Consciences need to communicate several ideas to the User as outlined in this document. As such, they should have an audio aspect to their expressions as well.

Physical Interactions

The User is capable of selecting a Conscience on the screen, so some audio cue should be sounded to give a more tangible feeling to the User's direct, physical interactions with the Conscience.

Emotion

The Consciences communicate with the User via text for literal responses and queries, but they also can communicate via their facial expressions and glow rate. Additionally, the Conscience can emote aurally in non-verbal, brief musical expressions. An emotion change (such as a reaction to a Choice entry or purchase of a new accessory) should illicit an audio response from the Conscience.

The Conscience will announce their pleasure or displeasure via high-quality audio samples of a single, six-string acoustic guitar in standard tuning. To combat ear fatigue of repeated, monotonous exclamations, a set of audio exclamations will be diversified to produce a wide variety of expressions (major, minor, harmonic, dissonant, chord-based, arpeggiated) depending upon the situation.

UI

The UI will utilize general Apple system sounds to communicate UI status to the User.

Procedural Design

This section will outline the programming structures necessary to implement the Data, Architecture and Interface designs as well as the steps necessary to transform user input into actionable data.

User Entry

The primary functionality of the software will be to accept user data. The System will take these entries and transform it into tabulated data which the System can then use to provide feedback to the user both visually in the form of the Conscience and referentially in the form of reporting.

The entry fields on the forms will be as intelligent as possible. That is, where possible, a field will have the following properties:

- High Contrast Label – The label should be as descriptive as possible as to make help text redundant.
- High Contrast Entry field – The entry field itself can be several different types of presentation.
 - Plain text field – possessing no listeners
 - Intelligent text field – possesses listeners to match for previously entered data

- Scrollable Table View – possessing imagery, informative text and intra-section navigation capability
- Slider Bar – possessing ability to affect section dependent upon value of Slider.

User Feedback

One of the core design philosophies driving the development of the software will be the constant, positive feedback loop. The purpose of the feedback loop is to make evident to the User that any interaction with System will provide some level of reward (although graduated). There are four methods of feedback provided by the software: Moral Grade/Goal, Conscience Disposition, Milestone Rewards and Currency.

Moral Grade

The System will continually aggregate the User's entries into a Moral Grade that will be displayed prominently by the Home Screen. Whenever a User enters in a moral Choice, they will need to enter in an Alignment signifying how good or bad they think the act is. The System will tabulate and calculate a Moral Grade after each User entry. The grade will be displayed as a percentage representing the ratio between positive actions entered and total actions entered. This will be the primary deliverable of the software and the focus of most interactions with the User.

The algorithm to generate the User's Moral Grade is specifically defined in the System Calculations Section.

Additionally, the System will allow the User to set a Moral Grade Goal to set a bar of ethical behavior that he/she feels that they can meet. Since the Moral Grade Goal is set by the User, there are can be no hard consequences for meeting or failing to meet this goal as the User could simply change the Goal. While there will be some Milestones for meeting and maintaining this goal, the Conscience will attempt to fulfill this gap in functionality.

The idea of a percentage is a culturally independent concept. As such, it works well as a motivation for this software. However, value assignments to the range of percentages are dependent upon the way in which percentages are used.

- Academics – In many Western academic institutions, only the top 40% of the spectrum is used, such that 90% designates excellent work, where as 60% represents failure to accomplish anything. This makes over half of the scale useless.
- Economics – Any positive percentage growth is seen as good thing, and the scale is not bounded to 100. That is, growth can exceed principal (200% growth YOY), yet even a 1% growth can be seen as a positive outcome.
- Athletics – Given the highly competitive nature of physical sports, a success rate of half (50%, .500 averages) is seen as exceptional.

So the perception of a percentage is highly dependent upon the field in which it is used. A Moral Grade of 50% would be seen as negative to User in the academic field (or anyone that has attended a basic, federally provided education), but it would be positive to someone in athletics or finance. Given this conflict of perception, another vector of feedback is needed to give context to the percentage.

For new Users, the Moral Grade/Goal will be completely without context. Only after the User utilizes the software will they see where “good” and “bad” ranges lie. For this reason, the default Moral Grade Goal will be set at 50% to imply to the User that attempting to act in a moral fashion 50%

of the time is an admirable goal. The notion that 50% is positive will be reinforced by visual cues present in the UI.

Conscience Disposition

The User's Moral Grade (and by extension, the Moral Grade Goal) are somewhat abstract concepts. Given that percentages are used in different ways culturally, it is impossible to imply a universal weighting to the range of a percentage without some other feedback. The System needs to imply to the User in an additional fashion whether or not they are making positive strides in their moral growth. The Conscience's reactions to a User's inputs will provide this additional feedback.

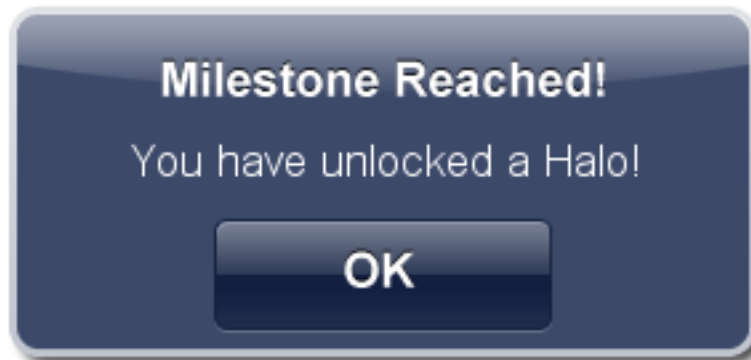
The Conscience will respond to almost every entry that the User makes as well as responding to trends over time. While some Users might be motivated by a numerical goal such as the Moral Grade, others might be visually motivated by a cipher that responds with a degree of humanity to the entries the User makes.

The Conscience will possess the ability to emote as defined in the Visual Design section of this document. By utilizing combinations of eyes, mouths, and glow the Conscience will be able to display a wide variety of emotion including happiness, sadness, anger and relief.

However, there is the risk that the User will not identify with any of the available Consciences, so there needs to exist supplemental ways in which to entice the User to continue to utilize the software.

Milestones

The User can customize his/her Conscience with software-supplied assets such as possessions, body parts and accessories attained as Milestone Rewards as well as procuring them with Ethicals earned. Once a User has completed a System-Defined Milestone such as entering in their first Negative Alignment, an application modal window will display alerting the User to the fact that they have completed a milestone and what has been unlocked.



The User can then be navigated to the Conscience Customization section and outfit the Conscience with their new possession, body part or accessory.

As the User continues to use the software, the reward curve will flatten, and it will become increasingly difficult to meet Milestones and be granted Milestones. The thought behind this is that the User must develop a pattern of utilization early on in their interactions in order to ingrain a pattern of usage in the User. Once this pattern has been set and the User has become invested in tracking their moral growth or decay, the User will not need as many incentives to continue to utilize the software.

Currency

The System will grant the User Currency in the form of Ethicals for every moral action that they record. However, the amount of Ethicals that the User can hold at any point in time is limited. If the User is only entering in moral actions, it is assumed by the System, that the User is not being completely forthcoming. However, it is natural to not wish to enter in unflattering information, so the System must incentivize this process.

Therefore, the User must increase the account limit by either entering in immoral actions or by answering Dilemmas posed by the Conscience. Either of these actions will increase the maximum storage of Ethicals allowing the purchase of more highly-valued items.

The notion here is that even if the User does not particularly care for the Conscience System, the accumulation of wealth is a typically, inherent human value. Even if the User does not wish to spend their Ethicals, the act of accumulating them might be an incentive regardless.

System Calculations

For every interaction with the User, the System will perform some calculation from merely tracking the use of the software to calculation of the User's Moral Grade.

Moral Grade

The calculation of aggregating User choices and time allotments to determine the User's current Moral Grade will be the primary purpose of the System. A form of Felicific Calculus as described by Jeremy Bentham will be utilized to calculate the moral decisions. It has been argued that Felicific Calculus is useless in measuring moral significance for a society, as morality is strictly, culturally relative. For the most part, this is true, but the process works for the System because a single User has the ability to discern their own beliefs on morality. The System does not attempt to weigh the moral quality of a User's action. Rather, the System is designed to allow the User to track what he or she believes to be morally correct or incorrect actions. Because the System is not attempting to quantify moral actions on a social level, the algorithm works well.

The algorithm has been updated for use by the System, as some of the metrics suggested by Bentham are either redundant or impossible to quantify.

- Vectors – The Vectors for calculation are Intensity, Fecundity, Pre-meditation and Extent. Intensity and Extent are all directly entered by the User, while the remaining Vectors are derived by the System.
 - **Intensity (I)**, signed integer, $-5 \geq I \geq 5$: How strongly is the choice positive or negative? The UI for Alignment is a sliding scale from -5 to 5 where -5 to 0 is decreasingly negative, 0 is neutral and 0 to 5 is increasingly positive. If the scale were from 0 to 10, $Abs(10) \triangleleft Abs(0)$. Therefore, the System should support $Abs(-5) = Abs(5)$ to show that an intensely negative choice is quantitatively equal to an intensely positive choice. Intensity needs to reflect this utilization of the scale.
 - $I = C_A$, where C_A is the Choice.Alignment.
 - If $I < -4$ || $I > 4$, then Choice.Screen2 is required.
 - **Fecundity (F)**, float, $-5 \leq F \leq 5$: Based upon prior Alignments, the System wishes to support the notion that a continued string of either positive or negative Choices heightens the impact of subsequent choices.

- If $(I_N * I_{N-1} > 0)$, then $F = I_{N-1}$, else $F = 0$, where I_N is Intensity of the current Choice and I_{N-1} is Intensity of the immediately prior Choice. The value of the prior Choice is utilized as it is the strength of that Choice that is carried over, not the doubling of the current Choice.
- **Extent (E)**, unsigned integer, $1 \leq E \leq 11$: How many people does this choice affect? In the UI, the System implies to the Users that AffectedParties are those other than themselves. The System will count the User as an AffectedParty on their behalf. The upper limit is 10 people and is considered a metaphorical bound rather than a literal one. The Moral Grade is greatly affected by this vector.
 - $E = \text{Count}(A_P) + 1$, where A_P is Choice.AffectedParties.
- **Pre-meditation (P)**, unsigned integer, $0 \leq P \leq 3$: How much thought did the User put into the Choice?
 - $P = \text{Count}(\text{Choice.Fields})/2$, where Count(Choice.Fields) is the number of optional fields the User chooses to enter in (Moral, Long Description, People Affected, Justification, Consequence, Hindsight).
- Units – Ethicals are the basic units of measurements for Morale. Ethicals are denoted by the lowercase Greek Epsilon, ϵ . Ethicals are unsigned, but a User input results in a positive or negative unit signifying either virtue or vice. Therefore, two divisions of Ethicals are needed.
 - **Hedons (η)** – positive ethicals, signified by lowercase Greek Eta
 - **Total Hedons ($T\eta$)** – Total number of positive ethicals the User has accrued.
 - **Dolors (δ)** – negative ethicals, signified by lowercase Greek Delta
 - **Total Dolors ($T\delta$)** – Total number of negative ethicals the User has accrued.
- Algorithm – The algorithm that calculates the affect that a Choice has on the the User's Moral Grade is as follows.
 - **Moral Assignment (MA)**, float, $-3800 \leq MA \leq 3800$ – The number in ethicals designating the morality of a given choice.
 - $MA =$
 - If $MA > 0$, $T\eta += MA$, else $T\delta += MA$
 - **Moral Total (MT)**, unsigned long, $0 \leq MT \leq N$ - This value is calculated every time the User enters or amends a Choice instead of being tabled as a User can retroactively amend Choices.
 - $MT = \sum_{(1-N)} \text{Abs}(MA)$, where MA is every Moral Assignment entered up until the lastest (not current) Choice. This is re-calculated with every User entry as the User can retroactively complete or amend choices. The absolute value is considered first, because the algorithm must sum the quantity for both hedons and dolors (not subtract).
 - **Moral Grade (MG)**, float, $0 \leq MG \leq 100\%$ – Moral Grade is ultimately expressed as a percentage, so the range from 0 to 1 is multiplied by 100.
 - $MG = (T\eta/MT) * 100$, where MT is the Moral Total and MA is the $T\eta$ is the total amount

of Hedons entered.

- **Moral Discount (MD)**, unsigned int, $0 \leq MD \leq 40\%$ – The User's Moral Discount assists them in acquiring accessories.
 - $MD = (T\delta/MT) * 40$, where $T\delta$ is the total amount of Dolors that the User has accumulated.
- **Moral Bank (MB)**, unsigned int, $0 \leq MB \leq N$ – Moral Bank is the amount of currency in ethicals that the User has to spend at the store.
 - **Moral Bank Increment (Mb_i)**, $Mb_i += \eta_i$, where η_i the total amount of Hedons that the User has accrued for a particular Choice. This value is calculated whenever there is a delta applied to the $T\eta_i$. This means that User will never be penalized for a Choice that produces Dolors.
 - **Moral Bank Decrement (Mb_d)**, $Mb_d -= StorePurchase.Price$, where $StorePurchase.Price$ equals the cost of an item.

Conscience Disposition

The User's Moral Grade will have an affect on the Conscience's disposition. However, this relationship is not linear. For the first revision, the Conscience disposition will be a 2 dimensional metric.

- Vectors – The 2 dimensional disposition will be composed of Enthusiasm and Mood. See the Morale Disposition Table for descriptions of the actual values.
- **Current Enthusiasm (En_N)**, int, $-7 \leq En_N \leq 7$: The range definition is such that if a User does not use the software at least once a week, the System will penalize the User with a decrement to the Conscience's Enthusiasm. The System will reward the User the more per week that they use the System.
 - **Days Elapsed - $D = 7 - Days(CurrentDate - Choice_N.DateModified)$** .
 - **If $En_N < -7$, $En_N -= 7$, Else, $En_N += D$** – If the User is utilizing the System at least once a week (by modifying or adding Moral Choices), the System will increase the Conscience's Enthusiasm, otherwise, the Conscience's Enthusiasm will decrease.
- **Current Mood (M_N)**, float, $-5.55612 \leq M_N \leq 5.55612$: The User affects the Conscience's mood by entering in Choices with an Intensity. The Conscience's Mood will be affected negatively by negative Choices and positively for positive ones.
 - $M_N = 1000 * [\tan(MA/MT) * \Pi]$ – The System assigns a current mood based upon the ratio of the current Moral Assignment to the Moral total bounded by +/- 5.
- Units – As the numerical value of the Conscience's Disposition is never shown to the User, units are not necessary. The values themselves are relevant.
- **Singular** – In most cases, the System will display the Disposition as a conjunction of the two Vectors.

- **Disposition:**0En,80M =Stuporous, yet Happy.
- **Matrix** – To instill some variety in the presentation to the User, the System will Matrix vectors together and when a ratio is achieved, combination of these two dimensions on a plot can produce a unique description such as:
 - **Disposition:**86En,25M = Anxious
 - **Disposition:**40En,55M = Relaxed
 - **Disposition:**20En,85M = Content
- Algorithm – The calculation is a simple look-up to System tables to assign a descriptive word to a numerical plot. User actions affect Mood and Enthusiasm in the following ways.
 - **Mood (M)**, float, $0 \leq M \leq 100$: The System will set the Conscience's default Mood at 85 as well, as it is easier to affect the Conscience's Mood than it is to affect its Enthusiasm.
 - $0 \geq M \neq M \leq 100$
N
 - **Enthusiasm (En)**, $0 \leq En \leq 100$: The System will set the Conscience's default Enthusiasm at 80 implying that any new relationship is exciting and potentially fortuitous. These values will be displayed when only one of the Vectors has changed.
 - $0 \geq En \neq En \leq 100$
N

Moral Grade Goal Proximity

The User's Current Moral Grade relation to the Moral Grade Goal affects the Disposition of the Conscience. Even if the User is not meeting his/her Moral Grade Goal, positive progress towards it is counted positively. The philosophy behind this is that it is more important to reward progress towards a goal rather than meeting the goal itself.

- Vectors – All Vectors are predefined from the Moral Grade calculation.
- Units – The Units for this calculation are Ethicals.
- Algorithm - If $T_n \leq T_{n-1}$, Then $T_n \neq 10\epsilon$.

Use Frequency

Receiving User data, loosely validating it and entering it into the User tables. This will measure the User's commitment in maintaining their own Moral Grade.

- Vectors – The Vector for Use Frequency is a simple Count of the number of User Choices and a selection of the datetimestamps.
- Units - NA
- Algorithm – The calculation is a matrix of the number of User entries over their Choice datetimestamps.

Bounds

There are various metrics inherent to the System. The bounds and conditions of these metrics are important to quantify to account for edge cases. It is necessary for the system to account for various degrees of nuance in determining a Moral Grade. For one example, a morally insignificant

choice that affects many people should be weighted closely to a morally significant choice that only affects a few people.

- **Moral Assignment** – Each Moral Assignment is a discreet valuation of a Choice from a User. It is analogous to one assignment in school or one event at a competition.
 - Lowest Edge Case (E_L) – -3800€, High Premeditation, High Negative Intensity, High Extent, High Fecundity. The User filled out all of the options fields (Affected Parties, Justifications, Consequences, etc.), selected the highest negative Intensity, affected more than 10 people, had previously entered in another negative Choice.
 - Medium Case – 0€, 0 Intensity. The User entered in a Choice that he/she believed to be morally ambiguous. Perhaps to consider the choice later.
 - Highest Edge Case (E_H) – 3800€, High Premeditation, High Positive Intensity, High Extent, High Fecundity. In other words, the User filled out all of the options fields (Affected Parties, Justifications, Consequences, etc.), selected the highest positive Intensity, affected more than 10 people, had previously entered in another positive Choice.
- **Moral Total** – Moral Total is a cumulative metric of all the Moral Assignments to date, both positive and negative. It is positive and unbounded as the User is not limited as to how many Moral Assignments they complete.
 - Lowest Edge Case (E_L) – 0€, The User has not entered in any Moral Assignments to date.
 - Low Case (E_I) – 4104€, The User has entered in an average of 171€, 3 times a week for 8 weeks.
 - Medium Case (E_M) – 144,00€, The User has entered in an average of 240€, 5 times a week for 3 months.
 - High Case (E_h) – 1,387,000€, The User has entered in the maximum number of ethicals for a single choice (3800€) for 365 days straight.
 - Highest Edge Case (E_H) – 4,294,967,295€, There are no functional bounds to the number of Assignments that a User can enter. The physical technical limit will be the maximum of an unsigned long. This turns out to be $E_h * 3096$ years, or if the User was intending to break the system, he/she would have to input the E_H Moral Grade (3800), 4000 times a day for a year straight.
- **Moral Grade** – The Moral Grade is the ratio between hedons (a positive assignment) and the Moral Total.
 - Lowest Edge Case (E_L) – 0%, The User has only entered in negative assignments.
 - Medium Case (E_M) – 75%, The User has entered in many more positive assignments than negative ones.

- Highest Edge Case (E_H) – 100%, The User has only entered in positive assignments.
- **Mood** – The Conscience's Mood is bound to a percentage from 0 to 100.
 - Lowest Edge Case (E_L) – 0, The Conscience is Livid. The User has acted completely immorally in regards to their own beliefs. A User can always redeem themselves, as the System will grant extra incentives once this “Rock Bottom” Edge Case has occurred. See the Milestones section of the Design Document as well as the Milestones data sheet.
 - Low Case (E_I) – 20, The Conscience is Depressed. The User has acted in a consistently immoral fashion.
 - Medium Case (E_M) – 50, The Conscience is Normal. The User has entered as many immoral acts as moral acts.
 - High Case (E_h) – 80, The Conscience is Happy. The User has entered in significantly more moral choices than immoral.
 - Highest Edge Case (E_H) – 100, The Conscience is Loving. The User has entered in only moral choices. However, this may indicate a lack of perspective in the User's entry. The System will question this Edge Case. See the Milestones section of the Design Document as well as the Milestones data sheet.
- **Enthusiasm** – The Conscience's Enthusiasm is bound to a percentage between 0 and 100.
 - Lowest Edge Case (E_L) – 0, The Conscience is Stuporous. The User has neglected the Software on an extremely consistent basis. A User can always redeem themselves, as the System will grant extra incentives once this “Rock Bottom” Edge Case has occurred. See the Milestones section of the Design Document as well as the Milestones data sheet.
 - Low Case (E_I) – 20, The Conscience is Apathetic. The User has entered in data from time to time, but has not developed a pattern of Use. The System will detect this Edge Case and will increasingly incentivize the User to improve their utilization patterns.
 - Medium Case (E_M) – 50, The Conscience is Normal. The User has neglected the System from time to time, but continues to hit the weekly entry pattern occasionally.
 - High Case (E_h) – 80, The Conscience is Excited. The User has entered in significantly more moral choices than immoral.
 - Highest Edge Case (E_H) – 100, The Conscience is Unbridled. The User has been completely consistent in their usage patterns. The System will reward this Edge Case. See the Milestone section of the Design Document.

Data ETL

Given that the system is highly dependent upon consistent User data entry, the System will need to possess the ability to ensure the integrity, reliability and fault tolerance of this data. To this end, the System will provide the User the ownership of his/her own data.

- Extract – The system will be able to extract its own data for archival or import purposes
- Transform – The system will be able to intelligently accept sub-optimal data import feeds.
- Load – The System will be able to import data exported from the system in the event of System failure (either external or internal).

Reference and Reporting

The System will provide a robust reporting functionality to allow the User insight into the milestones or setbacks that have occurred during the use of the software.

The Reference Section will serve two purposes:

- Resources – The User will be able to peruse high-level information about the various belief systems, historical figures and texts housed by Morallife. Upon researching listed references, the User will be able to notify the System that they have done so. This will lead to granted Milestones.
 - People – Historical Figures responsible for the Beliefs known to the software. Each Person will have Name, Region, Lifespan, Description, Quote, Text and Picture resources. The System will also externally link to the Wikipedia entry for the Person.
 - Texts – Texts important to the belief systems. Each Text will have Name, Date, Synopsis, Author(s), Picture and Detail resources. The System will also externally link to the Wikipedia entry for the Text.
- Reporting – The User will be able to generate reports on various criteria and data stores.
 - Usage – The User will be able to see how many times entries have been submitted.
 - Alignment – The User will be able to see a plot of alignment choices over time.
 - Conscience disposition – The User's Moral Grade and Conscience's disposition are not tied linearly. The User can see how his/her milestones, failures, fluctuations or stagnations are positively or negatively affecting their Conscience's disposition. penance