

# Detailed Design

## Subconscious Analysis Software (SAS)

**Requested by:**

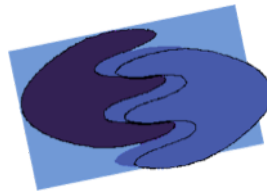
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## System Review

### 1.1 Product Overview

Our client, Dr. Breimer, is interested in researching biases using Implicit Association Tests (IATs). An IAT is a tool used by psychologists to test a person's bias of particular subjects based on the time it takes them to categorize stimuli objects relating to the subjects in question.

An IAT includes both a general demographic survey and the test itself. The survey is given to the participant before they take the test, so that whoever is viewing the data is able to thoroughly use the data to make conclusions. The reaction time test consists of four categories, including two pairs of opposites to compare to one another, and a set of stimuli objects associated with each category. One category from each pair is referred to as a primary category. These two categories are the main subjects that the test is checking for a bias. For example, a test may be as follows: the pair of opposites could be female and male, while the comparison pair could be computer science and liberal arts. This test example might check whether an IAT participant has positive or negative feelings about females in the computer science field, and how strong those feelings are. The primary categories in this example would be female and computer science.

The associated stimuli objects can be either pictures or words that correspond to the categories. A participant categorizes a stimuli object quickly by pressing one of two keys on their keyboard. The time it takes a participant to categorize certain stimuli is what helps calculate the bias they may have. Due to the fact that there are 200 associations, split into 6 blocks, in each test, creating IATs and collecting the data from them can be very time consuming. enigma elucidation will create a website where Dr. Breimer can log in as the administrator and create IATs. This software system, called Subconscious Analysis Software (SAS), will generate a URL for each IAT created, which Dr. Breimer can then give to anyone he wishes to be a participant. SAS will store data and calculate results for each participant, which Dr. Breimer will be able to view and export in different formats that will help him further his research interests.



## 1.2 Development and Production Environment

For the development of SAS, enigma elucidation will be using the Windows and Macintosh computers provided by Siena College in the Software Engineering lab located on the 3rd floor of Roger Bacon room 348.

### Server:

Operating System:	CentOS (Linux) Release 5.2(Final)
Server Name:	sienasellbacks.com
CPU Type:	Intel Xeon X86_64 2.66 GHz
Web Server:	Apache version 2.2.9
Programming Language:	PHP version 5.2.6
Database:	MySQL version 5.0.45

### Windows Computer:

Operating System:	Windows Vista Enterprise (6.0, Build 6002)
Model:	Dell OptiPlex 760
Processor:	Intel Core 2 Duo
Speed:	2.93 GHz
Memory:	4 GB
Available Software:	<ul style="list-style-type: none"><li>• Mozilla Firefox</li><li>• Google Chrome</li><li>• Internet Explorer</li><li>• FileZilla</li><li>• Notepad++</li><li>• Microsoft Office</li></ul>

### Macintosh Computer:

Operating System:	Mac OS X 10.6.4
Model:	iMac 5,1
Processor:	Intel Core 2 Duo
Speed:	2 GHz
Memory:	1 GB
Available Software:	<ul style="list-style-type: none"><li>• Safari</li></ul>



## **1.3 User Case Narratives**

There will be two users of SAS, the administrator and the participant. While using SAS, these two types of users will have access to IATs, but in different ways. The admittances of the two users of SAS are described below.

### **1.3.1 Dr. Breimer / SAS Project Client / SAS System Administrator**

There will be a single administrator account for this system. The Administrator will be the client, Dr. Eric Breimer, and anyone else Dr. Breimer decides to share the account with. The Administrator will be able to login to an account on the SAS website with a specified username and password. Once logged in, the Administrator will have the ability to create new IATs. The Administrator will be able to create a unique demographic survey to help the Administrator analyze the new IAT. The Administrator can insert categories and selected stimuli associated with these categories. After all of the stimuli objects are chosen, the Administrator has the option to choose whether or not a Participant will be able to view the Participant's results after the Participant is done taking the IAT. When the Administrator is finished creating an IAT, the Administrator can save the IAT and a URL will be presented so that the Administrator can give it out to Participants for that particular IAT.

The Administrator may logout of the system at anytime.

### **1.3.2 IAT Participant**

The IAT Participant is anyone who is given a URL to a specific IAT by the Administrator and chooses to take that IAT. When the IAT Participant takes the IAT, the IAT Participant will first be presented with a brief but detailed demographic survey that is associated with the IAT. After completion of the survey, the Participant can take the test. After the IAT is completed, if the Administrator lets the Participant view the Participant's results, the Participants results will be displayed. The Participant will be thanked for participating in the Administrator's research interest.

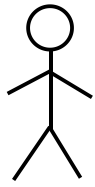


## 1.4 UML Use Case Diagram

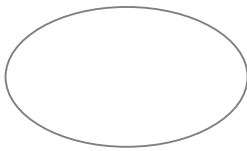
Subconscious Analysis Software's UML Use Case Diagram shows all the different users of the system, including both human and non-human. These are called actors. The diagram also shows the functions each user can perform called uses. Each user of SAS is connected to different functions in the diagram by lines, called participation lines. Below is the legend of the SAS UML diagram, followed by the actual diagram.

### 1.4.1 Legend

The legend explains all objects used SAS' UML Diagram and what they represent.



**Actors** - Users that interact with the system. Human users are on the left, and non-human users are on the right.



**Use Cases**- The interactive activities that occur between the Actors and the SAS.



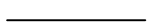
**SAS**- Represents SAS, Subconscious Analysis Software. This is our project.



**Inheritance Arrow**- Lines that point from parent use cases towards sub use cases that can function independently from their parent use cases.



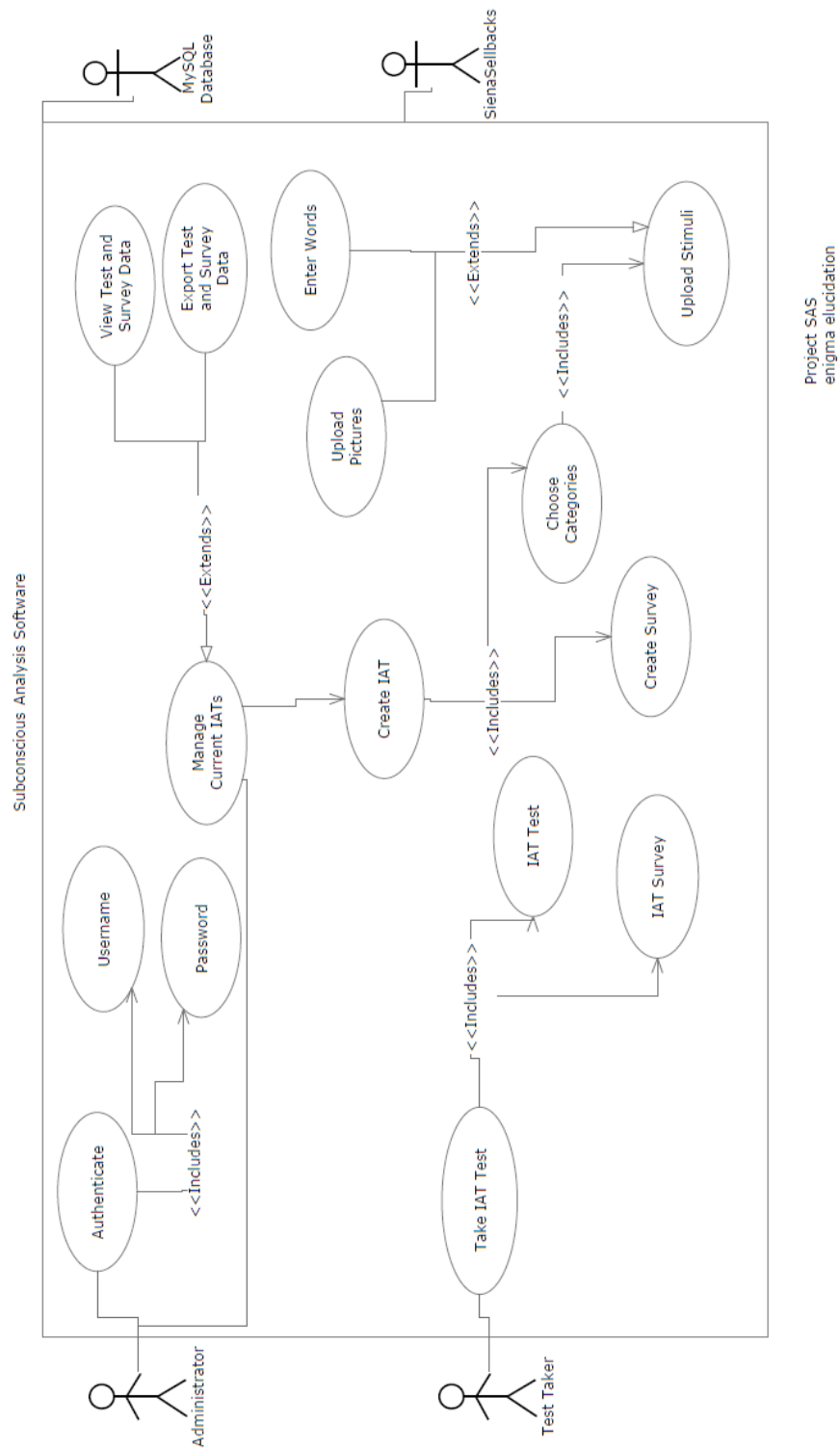
**Inclusion Arrow**- Points from use cases towards their respective included use cases.



**Participation Line**- Depicts the relationship between actors and their uses.



## 1.4.2 UML Use Case Diagram



The UML Use Case Diagram shows all the major functions of each user of Subconscious Analysis Software.

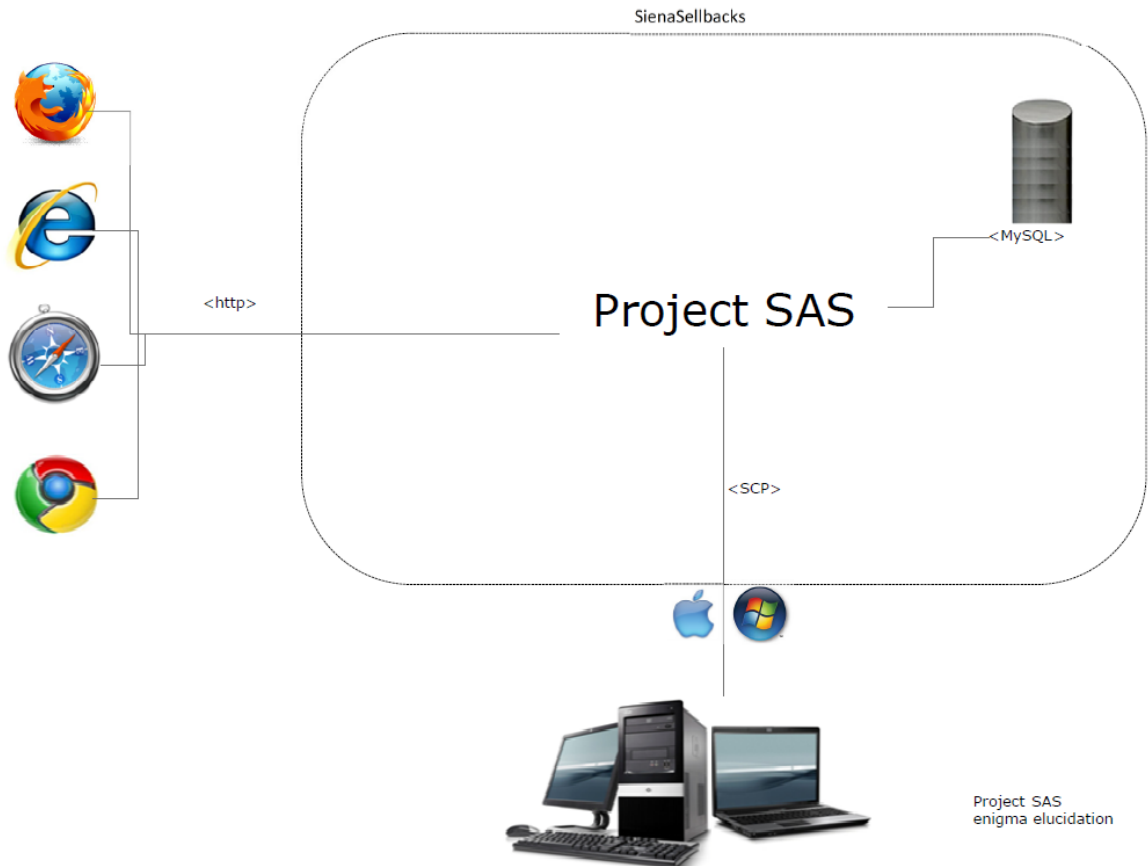




## Detailed Design

### 2.1 UML Deployment Diagrams

The deployment diagram shows the different components that interact with SAS, including the different browsers, the developing environment, and the database.





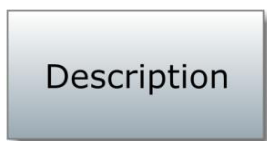
## 2.2 UML Activity Diagrams

The UML Activity diagrams show how the users interact with SAS during the tasks that are critical to the operation of the system. The diagrams show the decisions and processes that are involved in each operation.

### 2.2.1 Legend



**Start/End**- Represents the start and end point of the process.



**Activity**- Describes the actions being taken.



**Decision**- Describes a decision that causes the process to branch



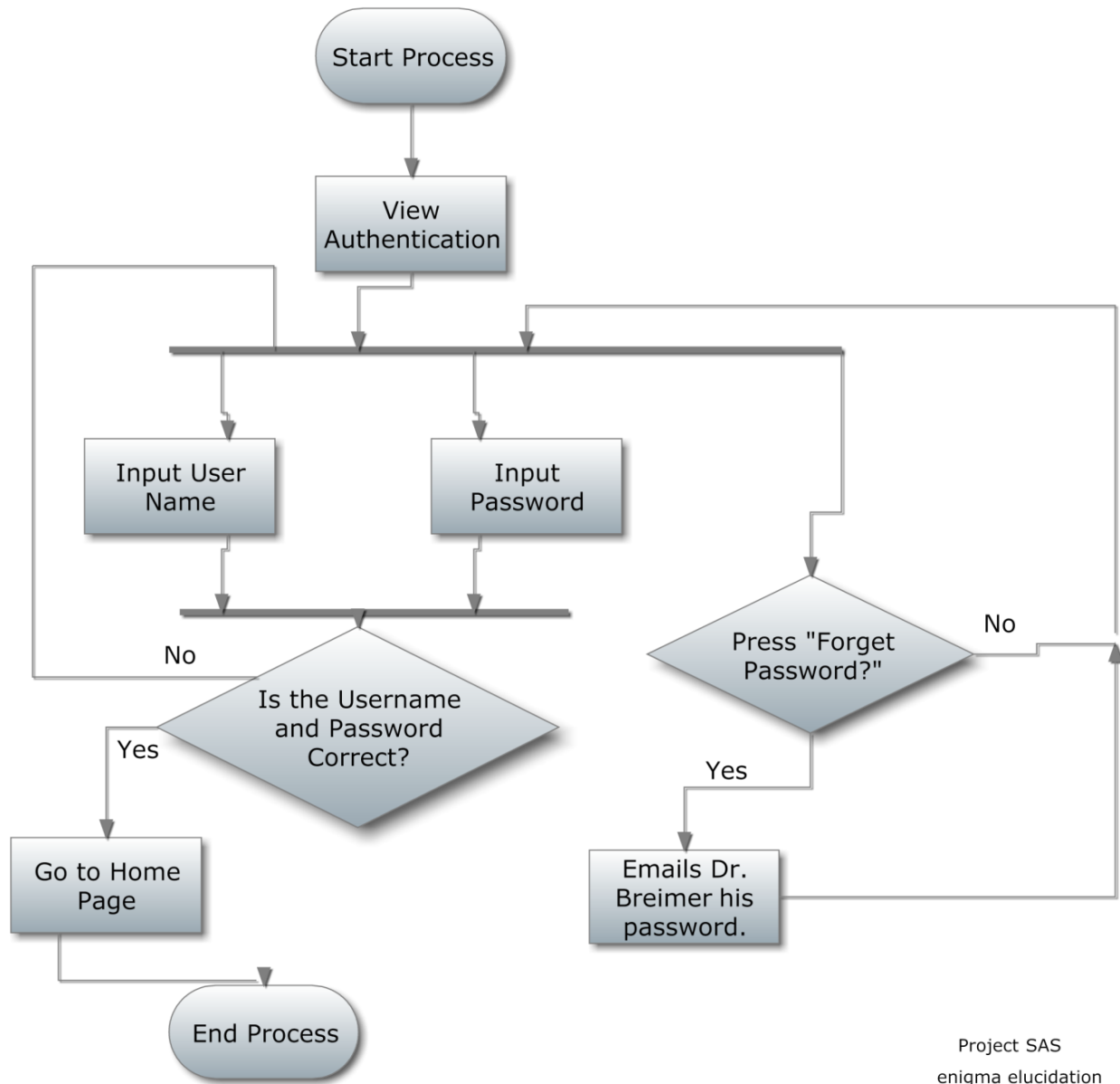
**Arrow** - Shows the direction of procedure from one activity to another

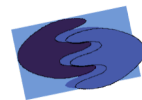


**Splitter**- Arrows directed away from the bolded line indicate that the processes they point to are performed simultaneously. Arrows that point towards the bolded line indicate that the procedures they point from must execute before the next step can occur.

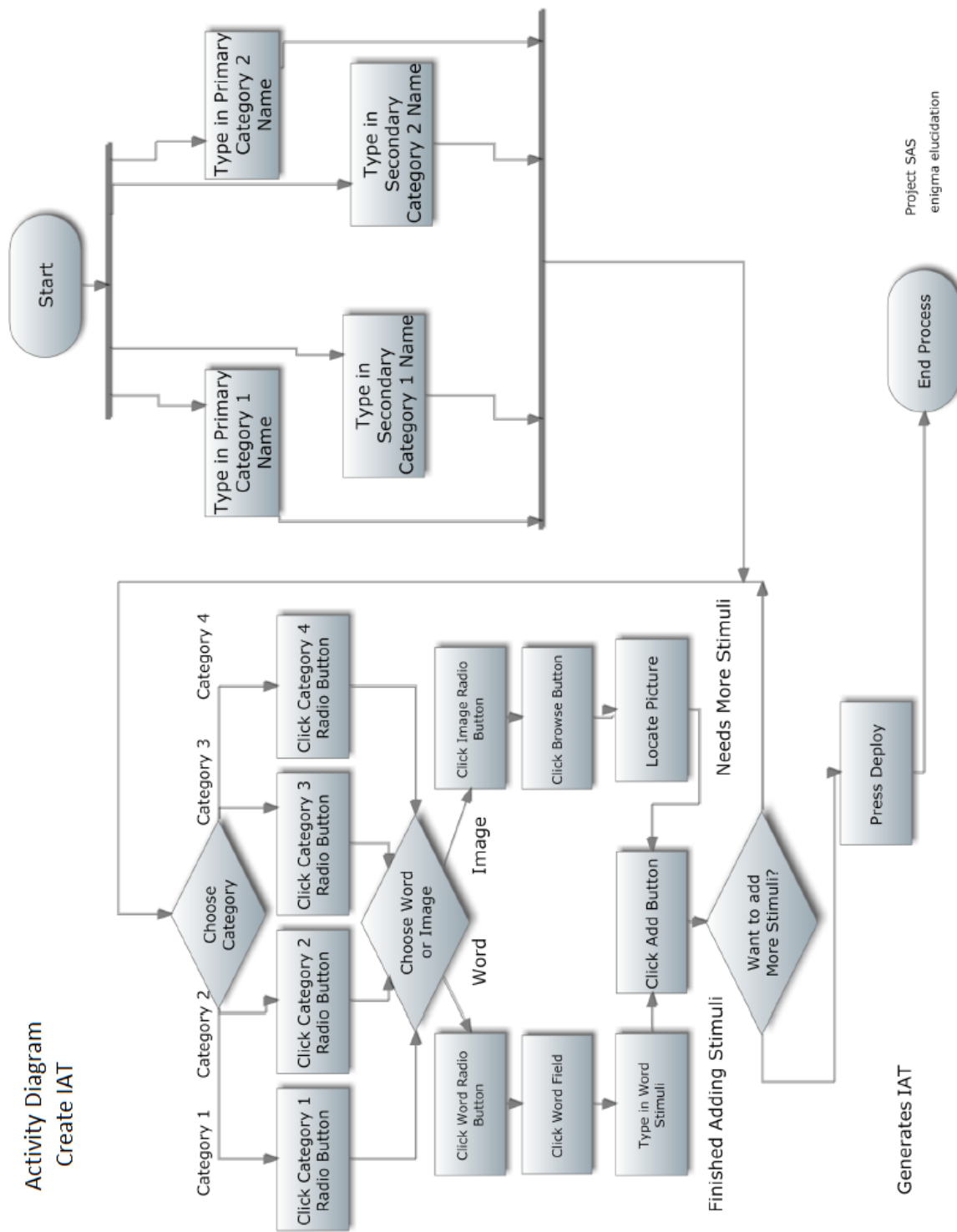


## 2.2.2 Authenticate (Administrator)





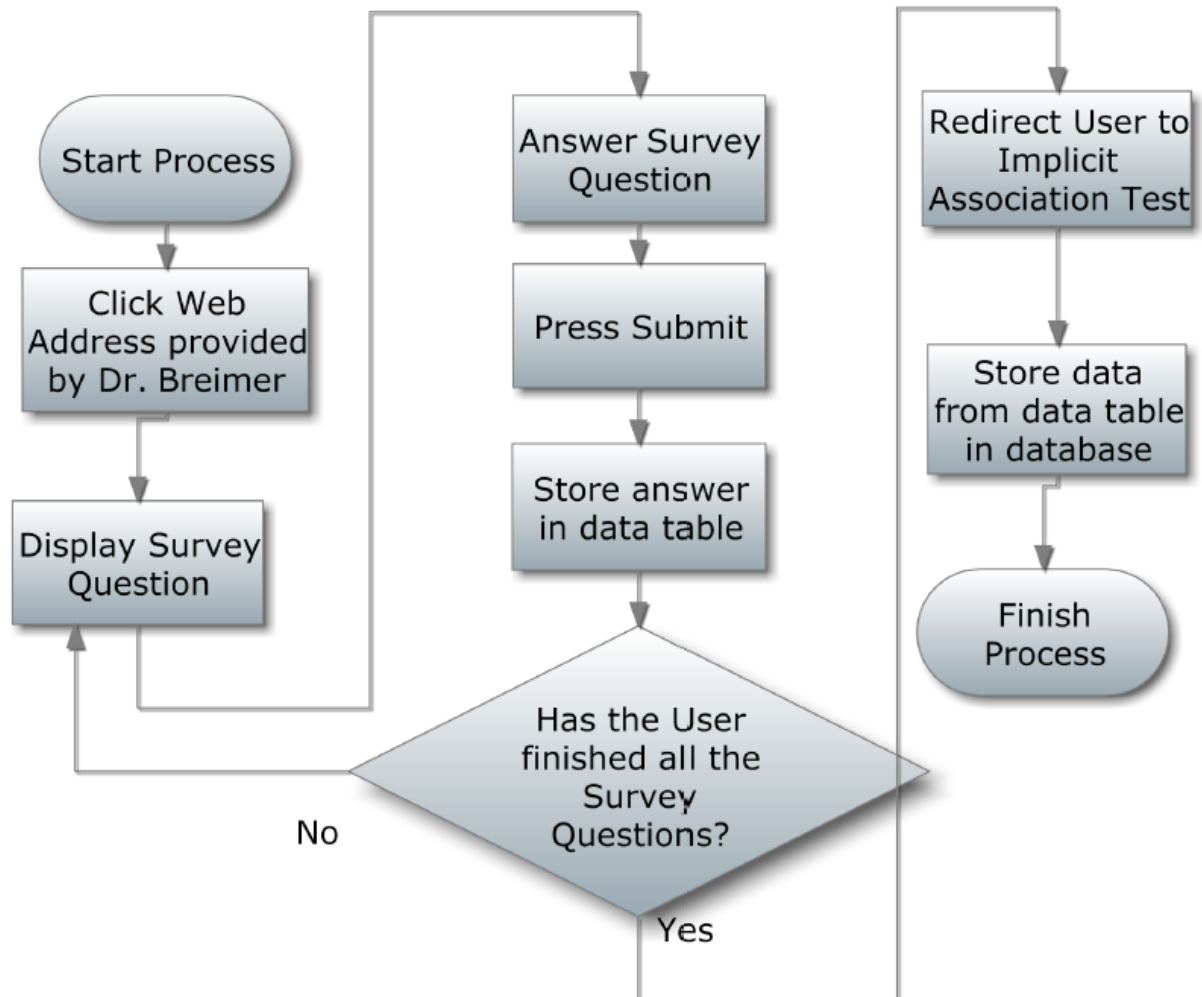
### 2.2.3 Create IAT (Administrator)





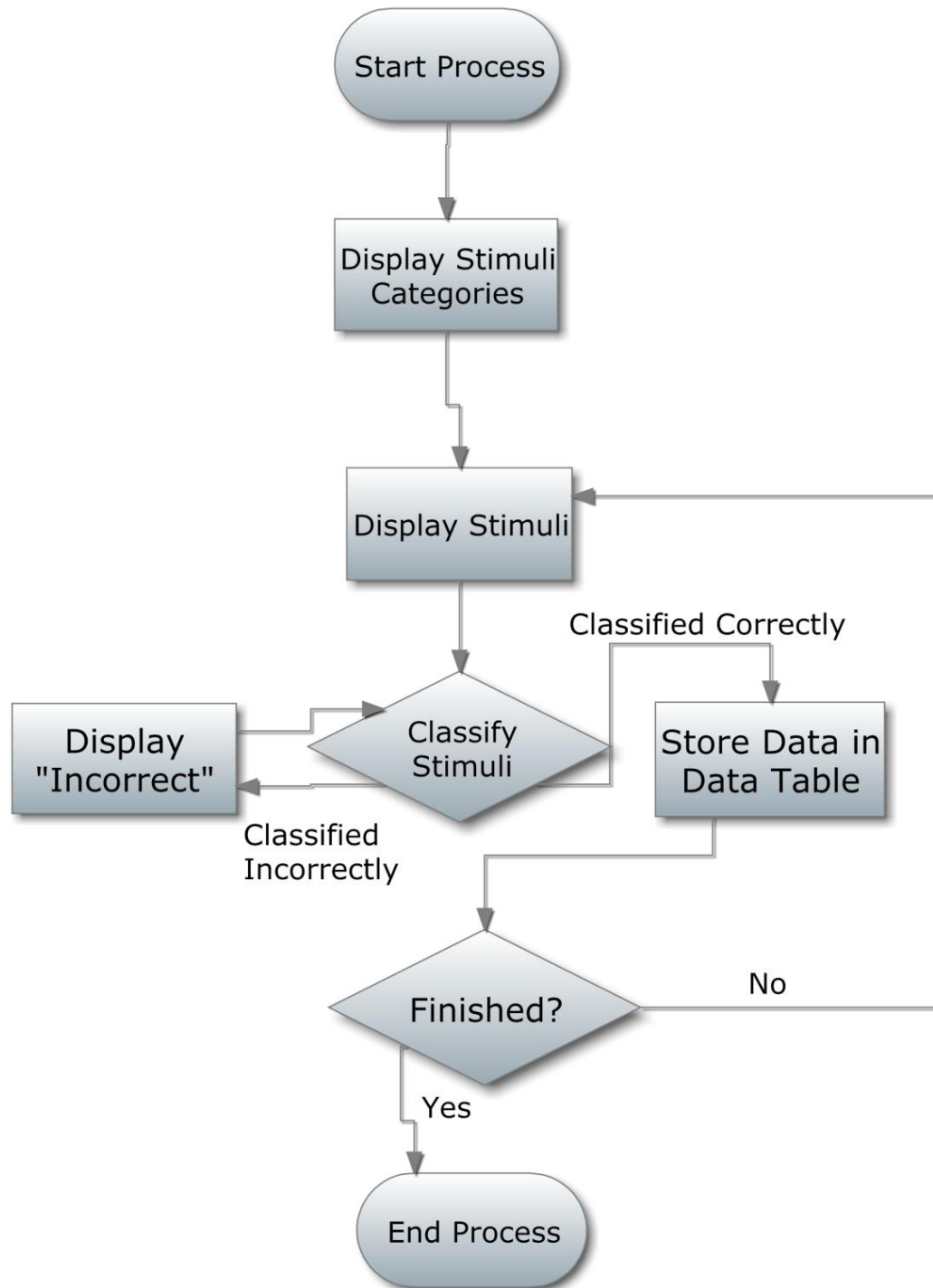
## 2.2.4 Take Survey (Participant)

Activity Diagram  
Take Survey



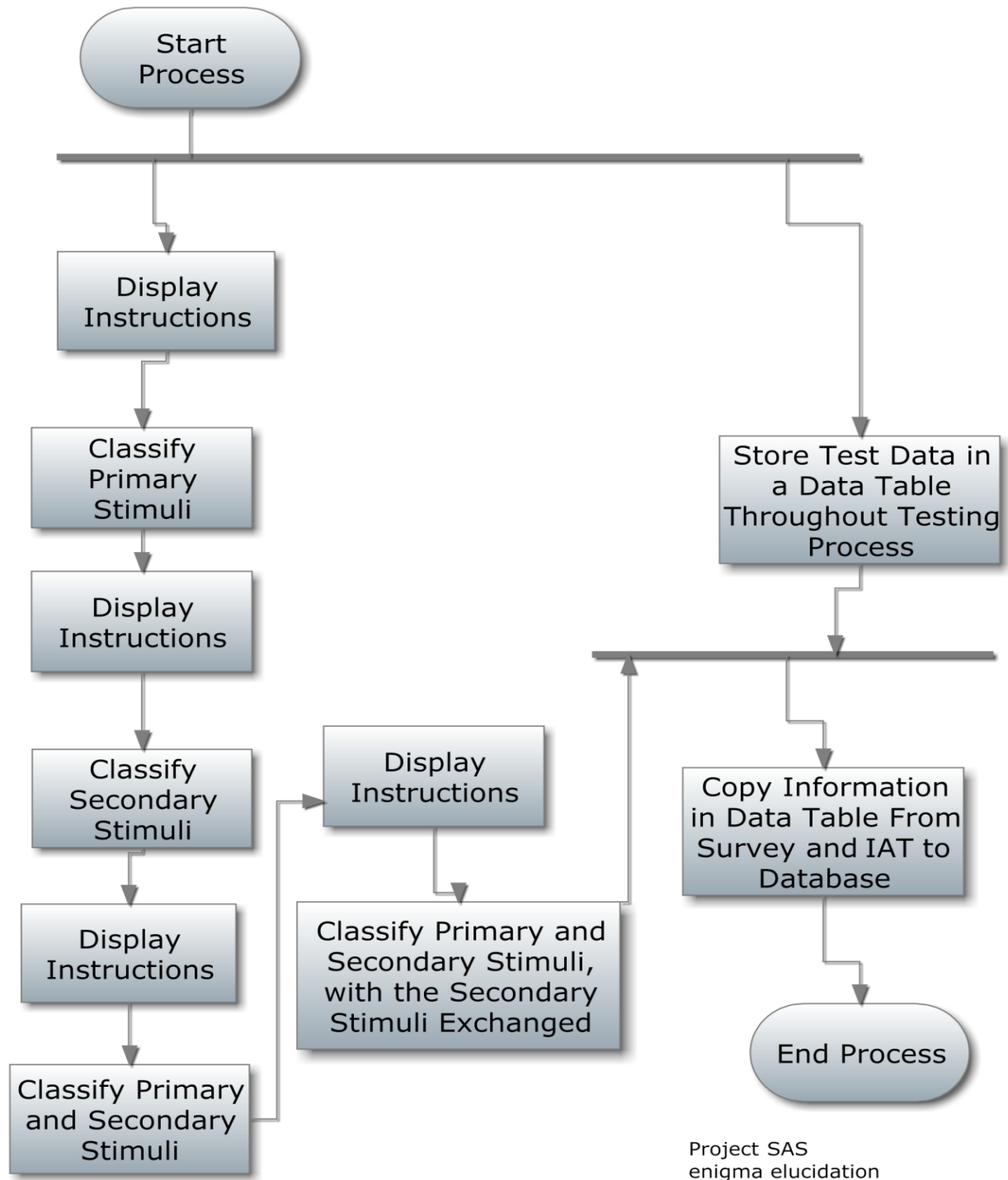


## 2.2.5 Take IAT (SAS Process)





## 2.2.6 Take IAT (Participant)



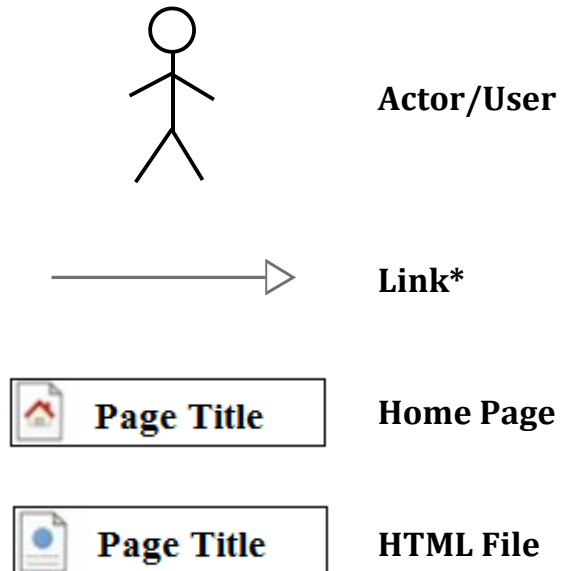
## 2.2.7 View Data (Administrator) \*



## 2.3 Website Map

The website map shows the organization of SAS's website. In addition to showing how pages link to each other, our website map also shows which users can view which websites.

### 2.3.1 Website Map Legend



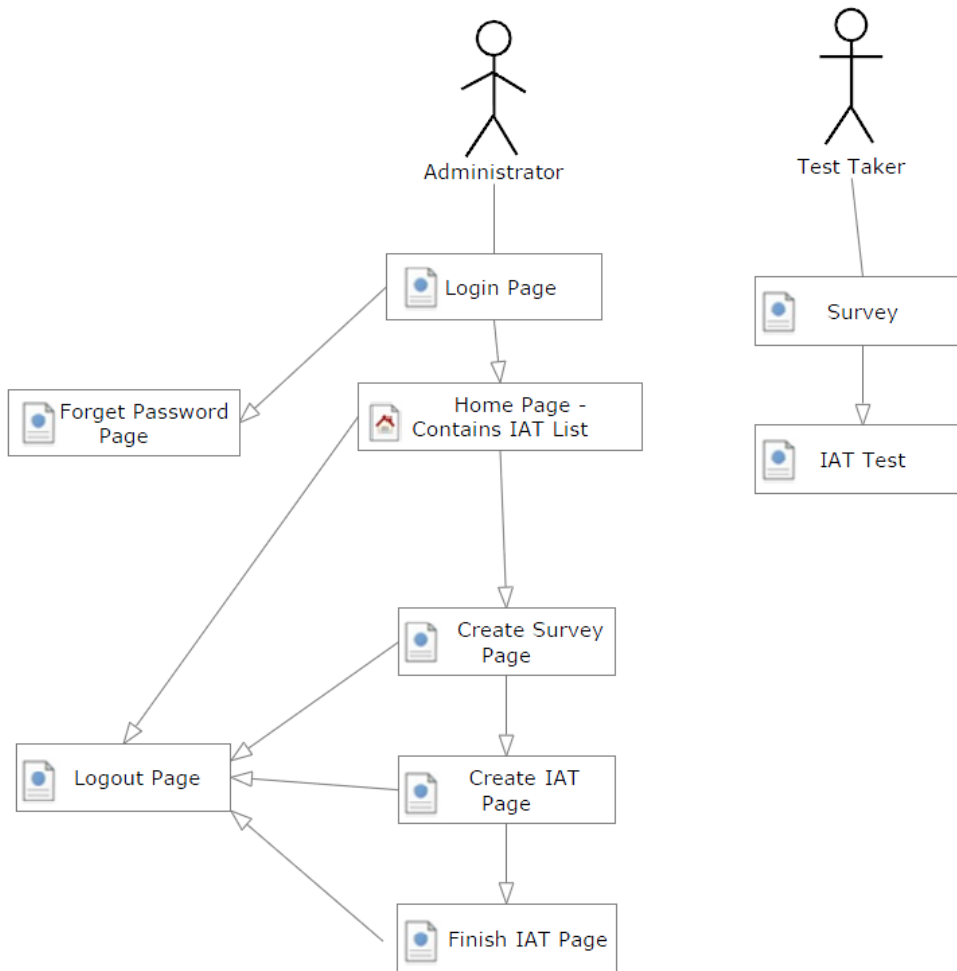
\*Double Arrow signify linked pages as being doubly linked





## 2.3.2 Website Map

Website Map



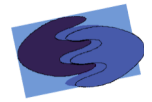
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## Data Stores

### 3.1 Logical Data Dictionary

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Data Dictionary	
This data dictionary is used to record all data entities used and recorded in SAS' software.	
Key:	
Table	Name of the table data is stored in
Data Name	Name of the data that is being stored in the database
Applied Process(es)	Processes in which the data is involved
MySQL Data Type	The type of the inputted data
Data Size	The acceptable size of data
Description	Brief description of the data
Acceptable Input Characters	Valid characters that can be accepted by the system
Unacceptable Input	An example of data that will not be accepted by the system
Notes	Any other important information about the data

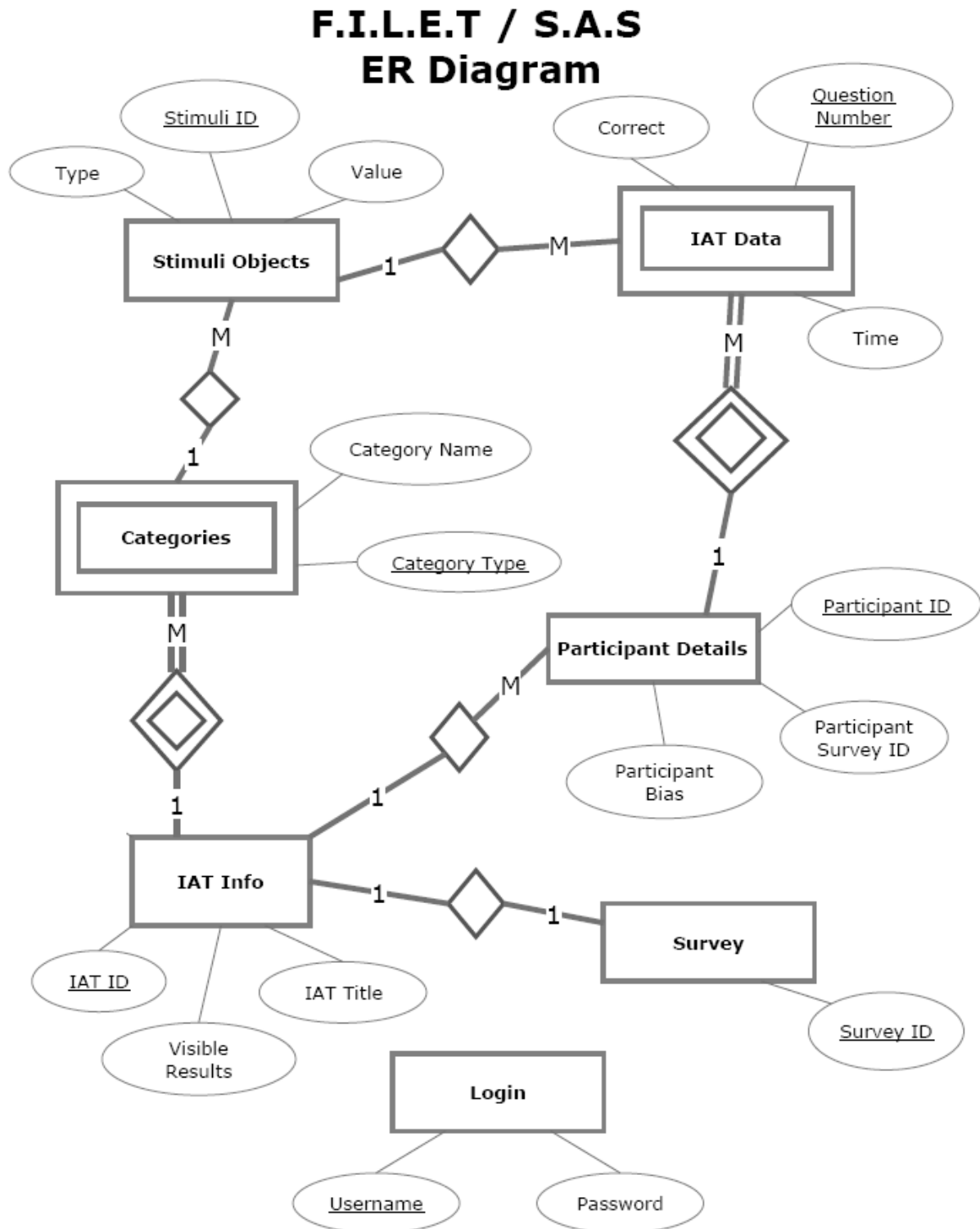


enigma elucidation									
Data Dictionary									
Table	Data Name	Applied Process(es)	MySQL Data Type	Data Size	Description	Acceptable Input Characters	Acceptable Range of Input	Unacceptable Input	Notes
Categories	Category Name	C, V, T, E	varchar	1-50 Characters	Name given to the different categories		A-Z, a-z, 0-9	" "	
Categories, Stimuli Objects	Category Type	C, V, T, E	varchar	1-50 Characters	Distinguishes the category type that the stimuli falls under	P1, O1, P2, O2	A-Z, a-z, 0-9	null	
IAT Data	Question Number	V, T, E	int	1-3 Digits	Question number in IAT	numbers 1-200	0-9	first	
IAT Data	Time	V, T, E	time	1-10 Digits	Time (ms) it took participant to answer questions		0-9	flag	
IAT Data	Correct	V, T, E	int	1 Digit	if the participant got the question right or wrong		0-1	" "	
IAT Data, Stimuli Objects	Stimuli ID	C, V, T, E	int	1-2 Digits	Unique ID for Stimuli Object		0-9	computer	
IAT Info	IAT Title	C, V, T, E	varchar	1-50 Characters	Title of IAT		A-Z, a-z, 0-9	IAT	
IAT Info	Visible Results	C, V, T	int	1 Digit	States whether or not participant can view their IAT result		0-1	yes	
IAT Info, Participant Details, Categories, Stimuli Objects	IAT ID	C, V, T, E	int	1-3 Digits	Unique ID for IAT		0-9	THE IAT	
IAT Info, Survey	Survey URL/ID	C, V, T, E	varchar	1-200 Characters	Reference to the survey being used for the IAT		A-Z, a-z, 0-9, /, .	...	
Login	username	L	varchar	1-20 Characters	Username		A-Z, a-z, 0-9	()%*@!	only necessary for administrator
Login	password	L	varchar	1-20 Characters	Password		A-Z, a-z, 0-9, !, @, #, \$, %, ^, &, *, (, )	null	only necessary for administrator
Participant Details	Participant Bias	V, T, E	decimal	1-15 Digits	calculated bias score	decimal on or between ranges (-1) - 1	0-9	7	
Participant Details, IAT Data	Participant ID	V, T, E	int	1-9 Digits	ID of participant		0-9	q	
Participant Details, Survey	Participant Survey ID	V, T, E	int	1-9 Digits	Survey ID of participant		0-9	" "	
Stimuli Objects	Type	C, V, T, E	varchar	1-20 Characters	States what type of stimuli is stored: a text or a file path to an image		A-Z, a-z	2563	
Stimuli Objects	Value	C, V, T, E	varchar	1-100 Characters	Contains either the word stimuli or the file path to the image		A-Z, a-z, 0-9, /	null	



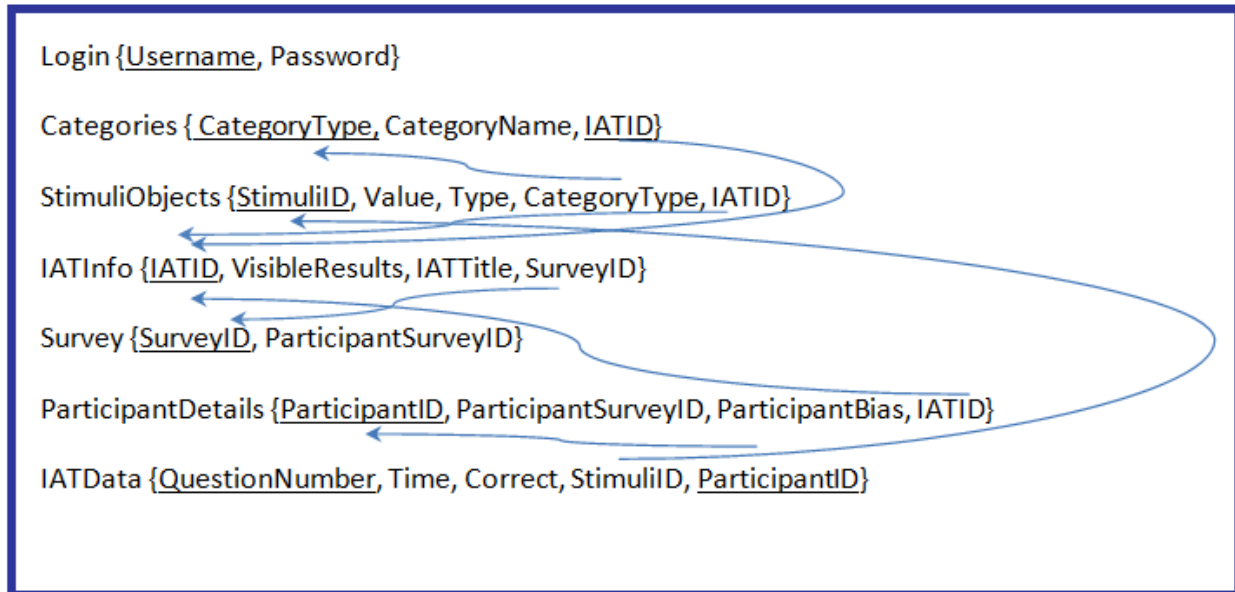
## 3.2 Logical Formats

### 3.2.1 Entity-Relationship Diagram





### 3.2.2 Database Relational Schema





## Prototypes

A prototype is an early model of a software application. The following prototypes of Subconscious Analysis Software (SAS) are the earliest and incomplete versions of the software program that we plan to develop. Note that our final product may be very different from these models.

### 4.1 Welcome

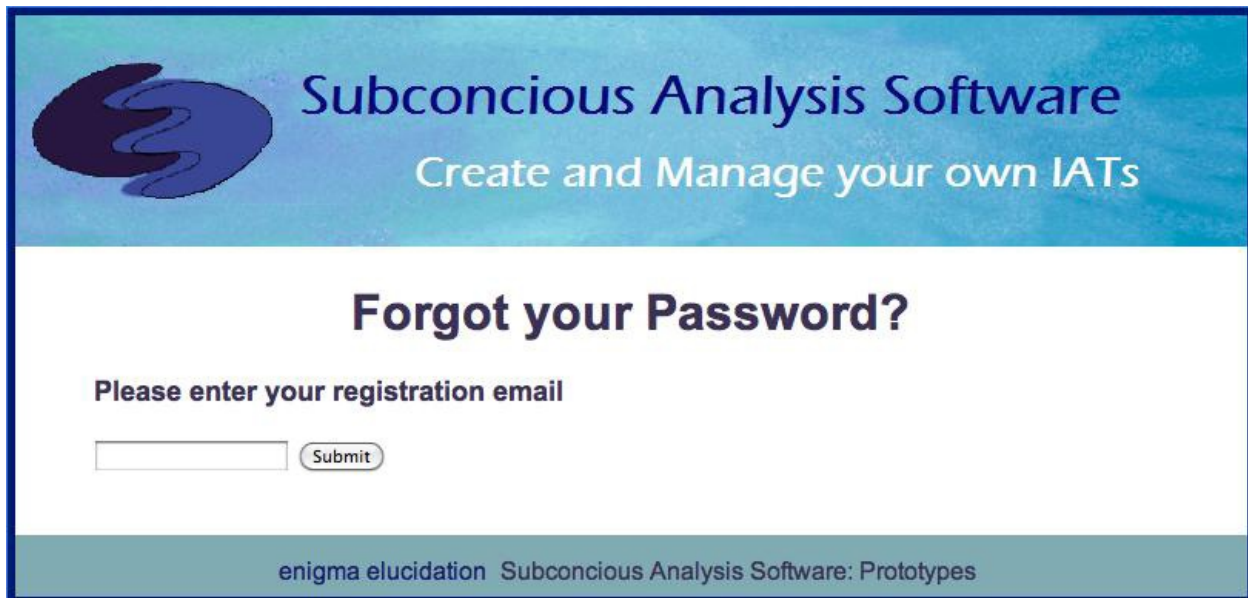
#### 4.1.1 Login

The screenshot shows a login page for Subconscious Analysis Software (SAS). The header features a blue background with a stylized 'S' logo on the left and the text 'Subconscious Analysis Software' and 'Create and Manage your own IATs' on the right. Below the header, the main content area is white and contains the heading 'Login to SAS:'. Underneath, there are two input fields: 'User Name:' and 'Password:'. Below the password field, there is a 'Login' button and a link for 'Forgot my Password'. At the bottom of the page, a footer bar contains the text 'enigma elucidation Subconscious Analysis Software: Prototypes'.

The login prototype shows a model of the screen the administrator will see upon signing into SAS with the administrative username and password.



### 4.1.2 Forgot Password



The forgot password prototype shows the screen the administrator would see if he clicked on the forgot my password button.

### 4.1.3 Welcome / Options



The welcome prototype shows the options that the administrator will have after logging into SAS.



## 4.2 Create IAT

The next five prototypes show the series of screens that the administrator will encounter if the administrator decides to create an IAT.

### 4.2.1 Category Selection

**Subconscious Analysis Software**  
Create your own IAT

### Create a New IAT Test

**Step 1:**  
[Create Survey](#)

**Step 2: Create Test**  
Choose Categories

	Primary	Opposite	
Pair 1:	<input type="text"/>	<input type="text"/>	<a href="#">Update</a>
Pair 2:	<input type="text"/>	<input type="text"/>	

[Logout of SAS](#)

enigma elucidation Subconscious Analysis Software: Prototypes

The category selection prototype shows the first screen the administrator will encounter during the creation of an IAT. This screen allows the administrator to either go on and create a survey, or insert the four categories of the IAT test.





## 4.2.2 Create Survey

The screenshot displays the LimeSurvey Demo interface. At the top, it shows the user is logged in as 'admin'. Below this, there are three main sections: 'Administration', 'Survey new temporary survey (ID:57282)', and 'Group group 1 (ID:1925)'. Each section has a set of icons and a dropdown menu. The 'Add Question' form is the central focus, with the following fields and options:

- Code:** 2 (Required)
- Question:** How do you feel about this question?
- Help:** (Empty text area)
- Type:** Long free text
- Validation:** (Empty text area)
- Mandatory:** Yes  No
- Question Attributes:** display\_rows (dropdown menu)

Below the form, there is an 'OR' section for 'Import Question', which includes a 'Select CSV File' button and a 'Choose File' button. The footer of the interface shows the LimeSurvey logo and version 1.53, along with a 'Like it? Donate to LimeSurvey' button.

The create survey prototype shows how the administrator will create a survey. This is a screen shot of the creation of a survey using Lime Survey, an open source survey generator that we will use to implement the create survey method of SAS.



### 4.2.3 Add First Stimuli Object

**Subconscious Analysis Software**  
Create your own IAT

## Create a New IAT Test

**Step 1:**  
[Create Survey](#)

**Step 2: Create Test**

**Choose Categories**

	Primary	Opposite	
Pair 1:	<input type="text" value="Technology"/>	<input type="text" value="Non-Technology"/>	<a href="#">Update</a>
Pair 2:	<input type="text" value="Women"/>	<input type="text" value="Men"/>	

**Choose Stimuli**

- Word
- Image

Word	Image	Technology	Non-Technology	Women	Men	
<input type="text"/>	<a href="#">Browse</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<a href="#">Add</a>


[Logout of SAS](#)

enigma elucidation Subconscious Analysis Software: Prototypes

The add first stimuli object shows how the administrator will choose the first stimuli object, a word or picture. The administrator must choose a category that this first stimuli object is associated with.



#### 4.2.4 Option to Delete added Stimuli Objects



## Subconscious Analysis Software

Create your own IAT

### Create a New IAT Test

**Step 1:**

[Create Survey](#)

**Step 2: Create Test**

**Choose Categories**



	Primary	Opposite	
Pair 1:	<input type="text" value="Technology"/>	<input type="text" value="Non-Technology"/>	<a href="#">Update</a>
Pair 2:	<input type="text" value="Women"/>	<input type="text" value="Men"/>	

**Choose Stimuli**

- ◇ Word
- ◇ Image

Word	Image	Technology	Non-Technology	Women	Men	
<input type="text"/>	<input type="button" value="Browse"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<a href="#">Add</a>

**Added to Your Test:**

Stimuli	Category	Delete
	Technology	<a href="#">X</a>
		






This prototype shows the administrator's option to view and delete stimuli objects already chosen for the IAT test.



#### 4.2.5 Finish Creation of IAT Confirmation

**Subconscious Analysis Software**  
Create your own IAT

**Your IAT Data:**

Stimuli	Category
	Technology
Java	Technology
	Non- Technology
	Women
Mom	Women



This prototype shows the page that asks that the administrator confirm that he would like to finish the creation of the IAT. This screen is essential because it makes sure that the administrator is done inserting desired stimuli objects for this particular IAT.



## 4.3 Take IAT

### 4.3.1 Directions Page

**Subconscious Analysis Software**  
Take an IAT

## Directions

You will now be presented with a set of words or images to categorize into groups. This requires that you categorize items as quickly as you can while making as few mistakes as possible. This part of the study will take about 5 minutes.

The following is a list of category labels and the items that belong to each of those categories.

Category	Items
Technology	Images and symbols of Technological Items
Non-Technology	Images and Symbols of Non-Technological Items
Women	Girl, Female, Aunt, Daughter, Wife, Woman, Mother, Grandma ..and Images of Women
Men	Uncle, Dad, Man, Boy, Father, Male, Grandpa, Husband, Son, Uncle ..and Images of Men

- Keep your index fingers on the 'e' and 'i' keys to enable rapid response.
- Two labels at the top will tell you which side to categorize the center item.
- Each word or image has a correct classification. If incorrectly categorized, a prompt will appear asking to re-categorize the item.
- Expect to make a few mistakes because of going fast. That's OK.

Continue

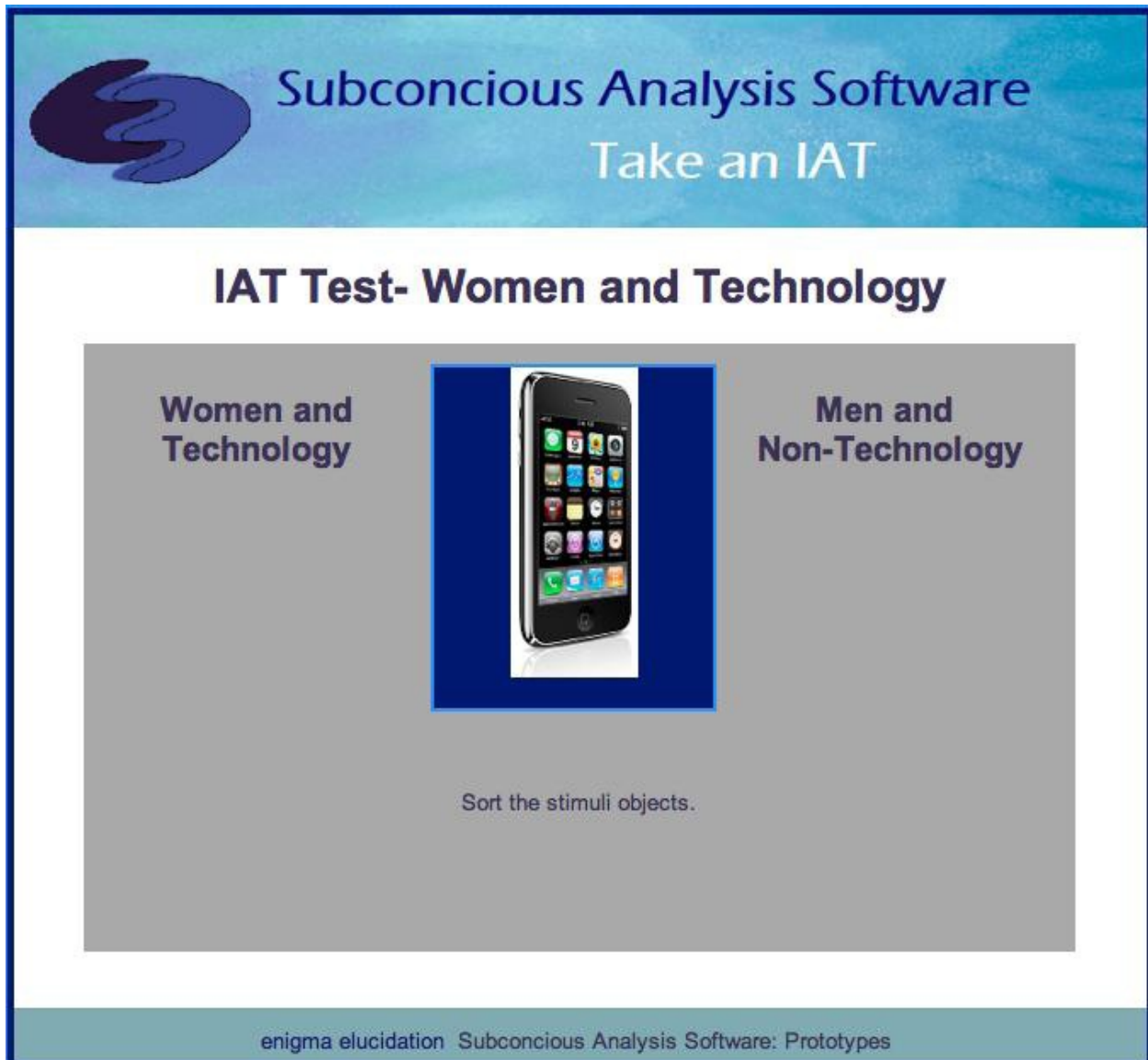
enigma elucidation Subconscious Analysis Software: Prototypes

The Directions Page explains to the participant how to take the IAT, what categories are included in the test, and what they should expect while taking the IAT.





### 4.3.2 Sort Stimuli

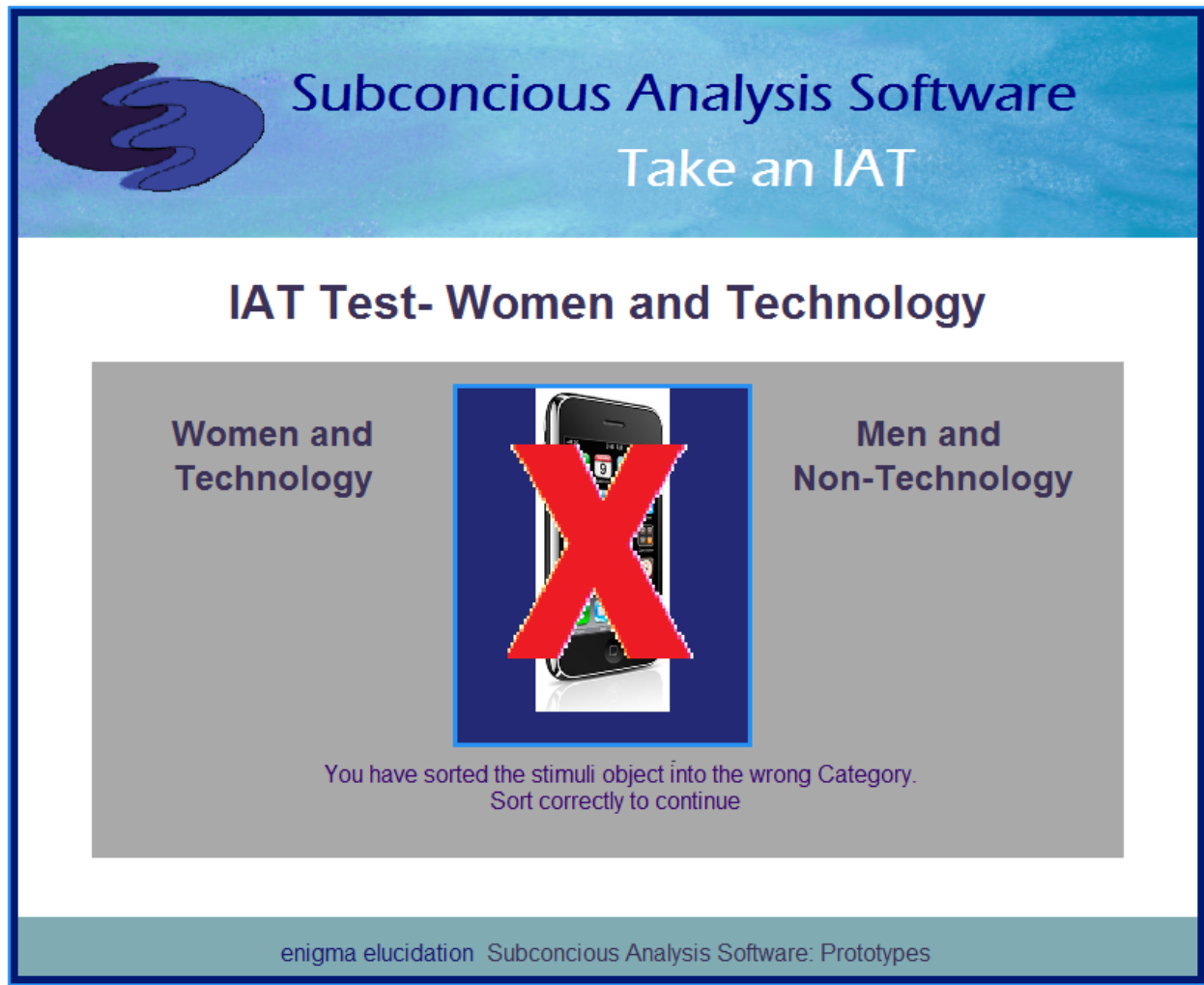


This prototype shows one of the blocks that the participant will see while taking the IAT test.





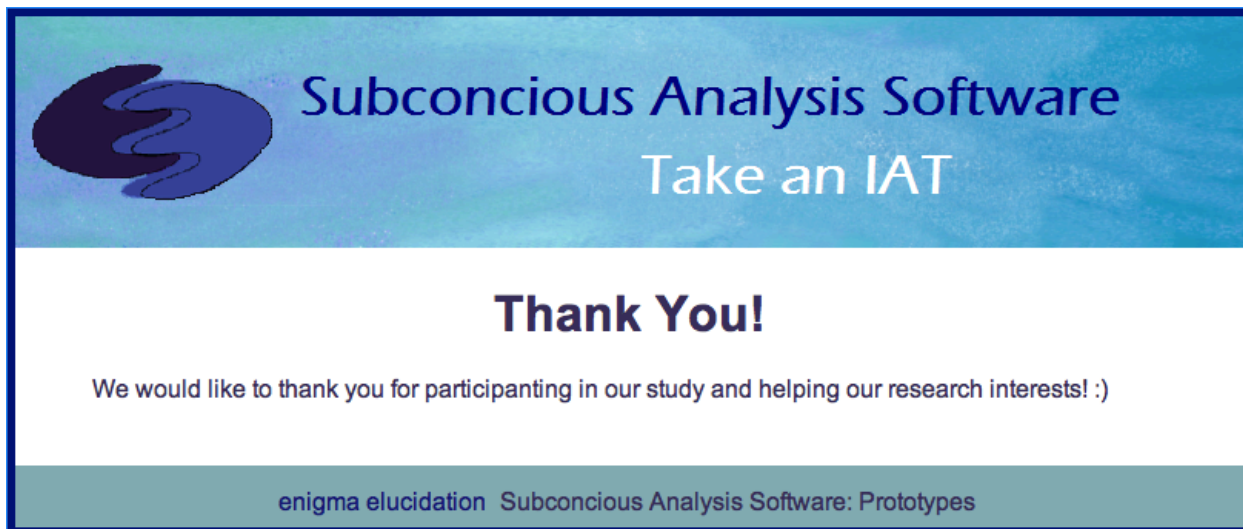
### 4.3.3 Incorrectly Sort Stimuli



This prototype shows one of the blocks that the participant will see while taking the IAT test, if they are to sort the stimuli object incorrectly.



#### 4.3.4 Thank You



Thank You screen appears after the participant completes the IAT Test, to thank the participant for helping with Dr. Breimer's research.

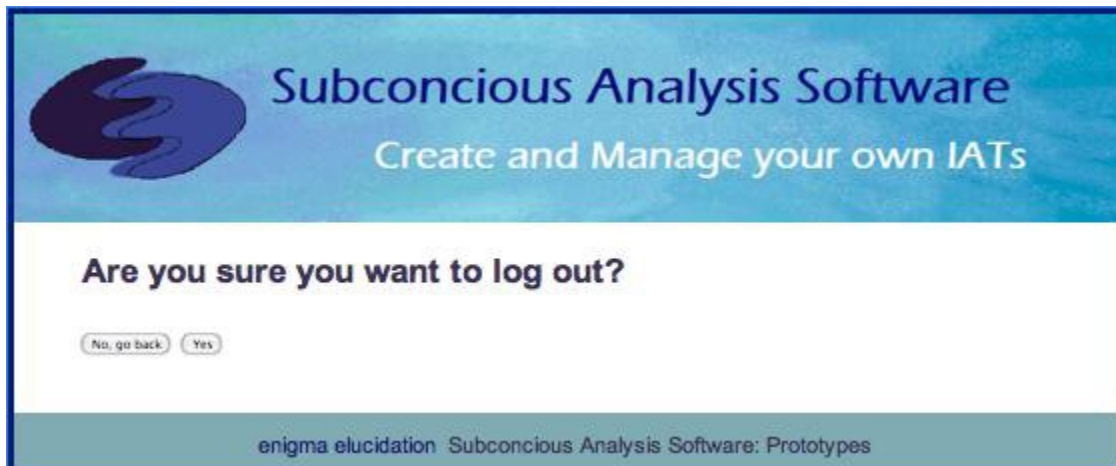


## 4.4 Manage IAT

### 4.4.1 View Participants of an IAT\*

### 4.4.2 View IAT Test Data\*

## 4.5 Logout



If the administrator decides to logout of SAS, he will be prompted with this screen so that he can confirm he no longer wishes to use SAS at this time.

**\*Information has been removed due to project split; FSH Technologies will be handling the backend of the project. This includes managing and viewing IAT, survey, and participant data. Additional information available in the FILET Detailed Design.**



## Glossary of Terms

**AJAX (Asynchronous JavaScript and XML)** - is a free group of interrelated web development methods used for quickly creating efficient and interactive Web applications.

**Apache** - an open source HTTP (hypertext transfer protocol) Server that hosts many of the Internet's websites.

**Chrome** - Web browser designed by Google

**CSS (Cascading Style Sheets)** - A style sheet language used to style webpages written in HTML and XHTML

**Data Flow Diagram (DFD)** - a graphical representation of the flow of data through a software system

**Database** - An organized collection of data designed for efficient and quick retrieval and storing of data.

**Firefox** - Internet browser designed by Mozilla

**Functional Requirements Inventory** - Defines what the system will be able to do that is testable

**Gantt Chart** - Gantt charts illustrate a project schedule specifying the start and finish dates of the terminal elements and summary elements of a project

**HTML (HyperText Markup Language)** - language for creating web pages

**IAT (Implicit Association Test)** - a psychology test that determines a participant's bias based on how a person categorizes stimuli and how fast they categorize it

**Internet Explorer (IE)**- Internet browser designed by Microsoft

**JavaScript** - a free scripting language that works on all major browsers usually embedded directly into HTML pages to add interactivity

**MySQL** - a open source relational database management system

**Non-Functional Requirements Inventory** - defines what the system will be that is not testable.

**PHP (PHP Hypertext Preprocessor)** - server side HTML scripting language

**Prototype** - A rudimentary depiction of the design of the final product

**Safari** - Web browser designed by Apple

**SAS** - Subconscious Analysis Software, enigma elucidation the software system.

**UML (Unified Modeling Language)** - a specification language used in software engineering

**UML Use Case Diagram** - a behavioral diagram used to identify the requirements of a system

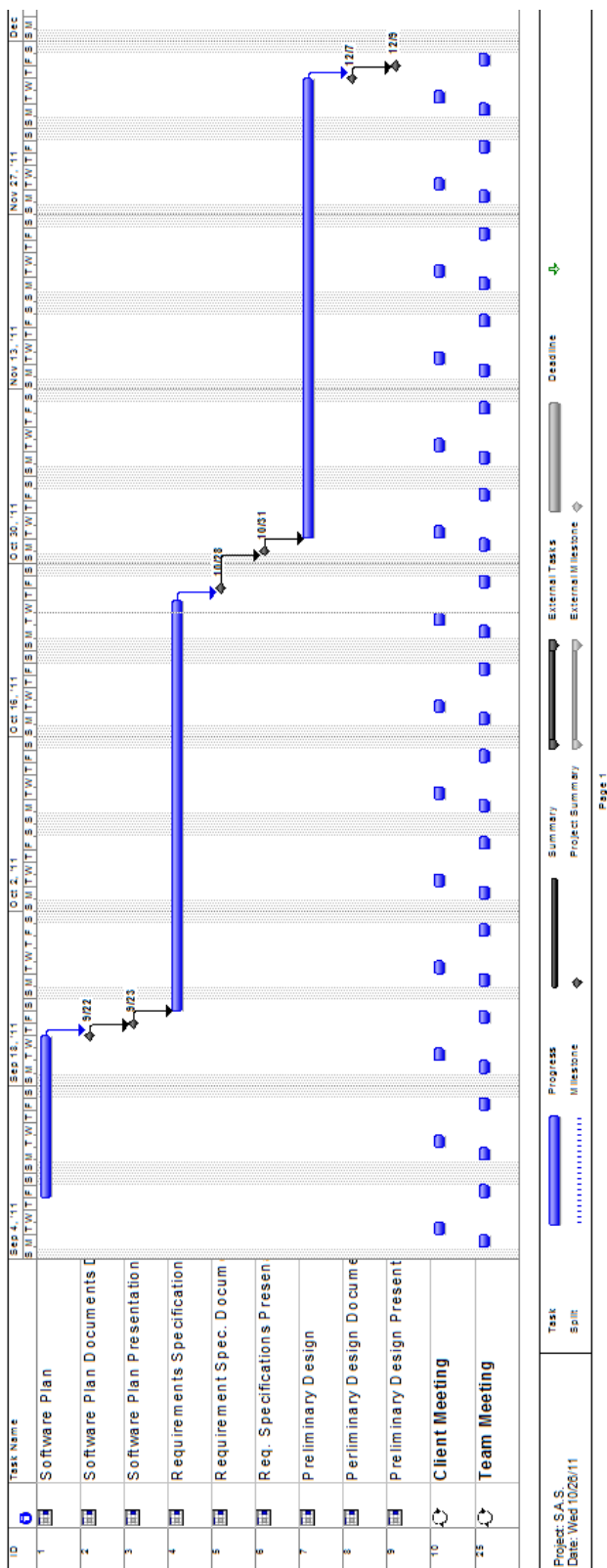
**XHTML (eXtensible HyperText Markup Language)** - a stricter and cleaner version of HTML (HyperText Markup Language)

**XML (Extensible Markup Language)** - A markup language designed to store and transport data; different from HTML which is designed to display data.



# Timeline

## 6.1 Fall 2011





## 6.2 Spring 2012

