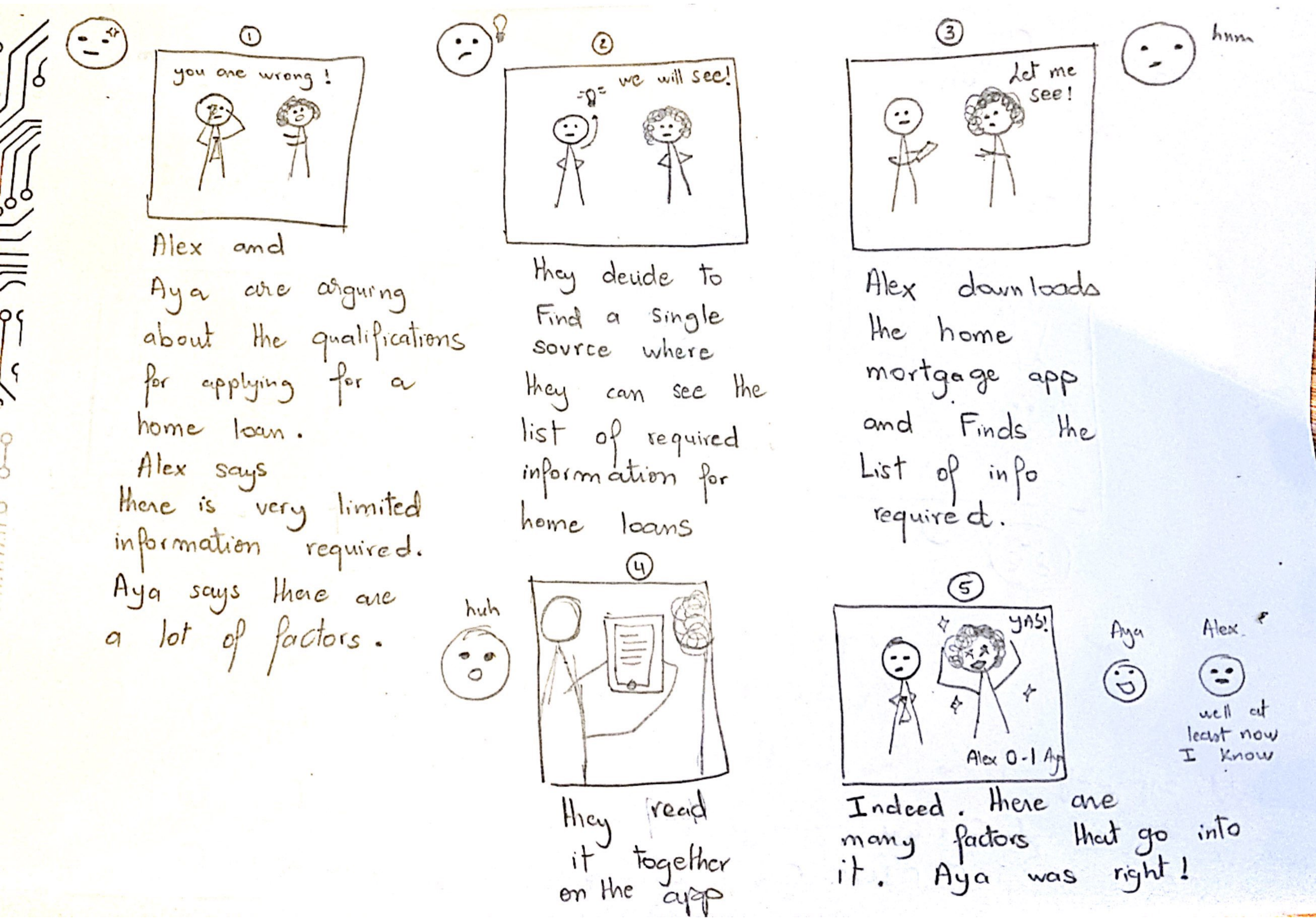
STORYBOARD 1



Alex and Aya are arguing about the qualifications for applying for a home loan. Alex says there is very limited information required. Aya says there are a lot of factors.

They decide to Find a single source where they can see the list of required information for home loans

Alex downloads the home mortgage app and Finds the List of info required.

They read it together on the app

Indeed. There are many factors that go into it. Aya was right!

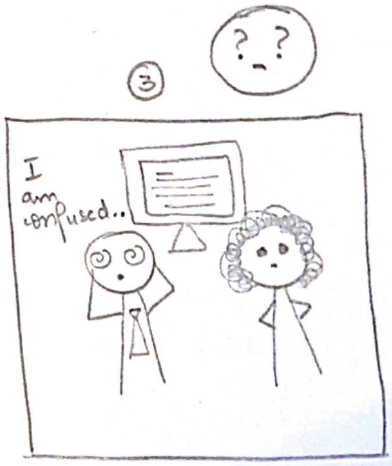
STORYBOARD 2

1
new house?
do we have enough money?

Alex and Aya have been saving money for a while. Now they are thinking about getting a new house

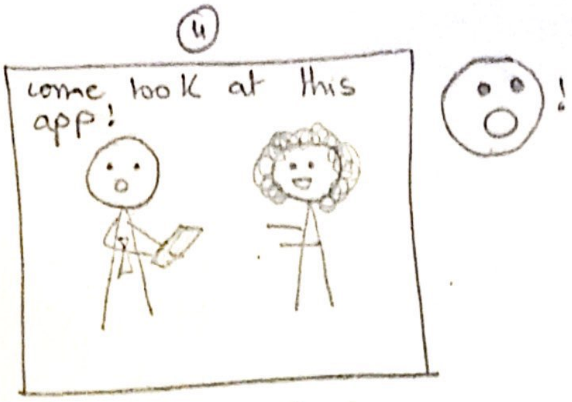
2
wait look! This is a nice one
OFFER
$$$
I agree!

They browse ~~the~~ house offers online and find a house they like



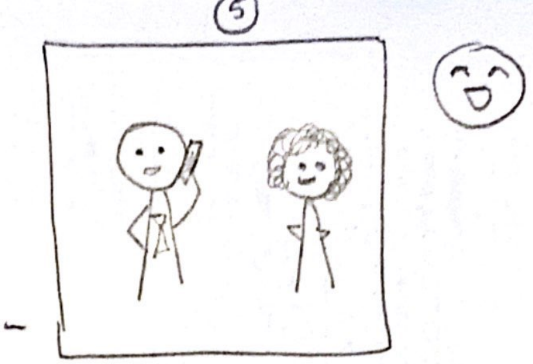
They look up the requirements For applying for a home mortgage but Each website Says something different

4



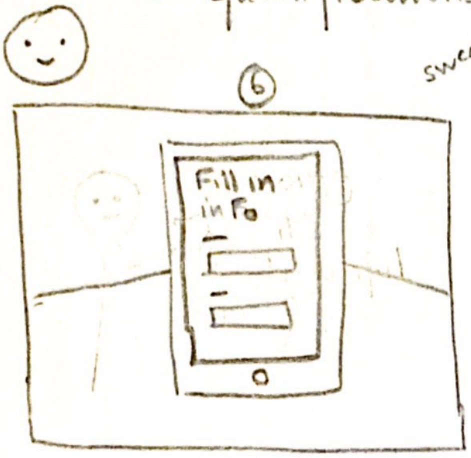
They look for an app where they can apply for a mortgage. This way they will know exactly what the qualifications are

5



Now they can gather. the documents needed to provide the information needed for the application

6



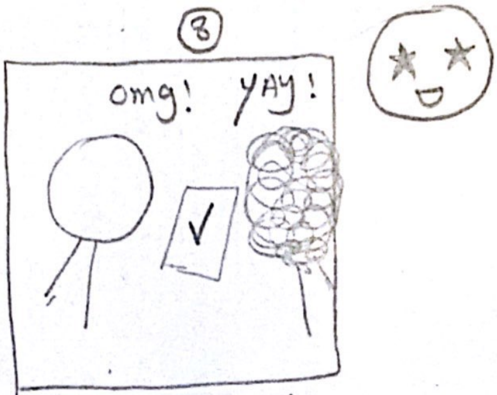
After getting everything, they fill in the application together.

7

sweat
now we wait

The application displays the estimated date of the loan decision.

8



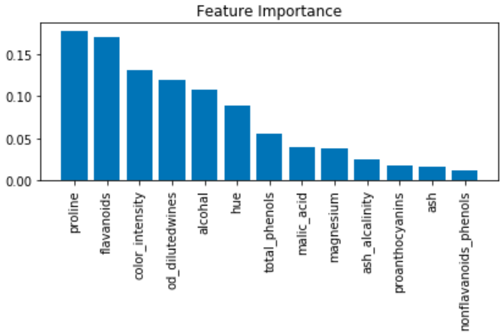
After that time period, they check the app to see the final decision (it was approved here)

Requirements for Classifiers :

In the example of the second storyboard, we would need to have two different classifiers depending on which mode the user would want to use, if it's basic mode, we can use a binary classifier such as logistic regression, or for a more advanced or complicated mode, we can use a tree classifier like Decision trees. Before deciding which mode to use, the user should be given all of the necessary information for each mode. After the outcome is displayed, users in the advanced mode should have the option to switch to the basic mode since the model already has all the information it needs, which is not the case in the switch from basic mode to advanced mode. For example, simple mode would have loan amount, income, property, credit score. While advanced would have those plus current loans, the number of applicants, home ownership, and desired number of months to repay the loan.

For the accuracy rate, we would calculate it using the confusion matrix (using the rate of false positives, false negatives, true positives, and true negatives from when we were developing our model, which can be updated whenever we improve the model's accuracy) such that accuracy rate = (TP+TN)/(TP+TN+FP+FN). and we would display the result in the form of the accuracy indicator from the paper "Will you accept an imperfect AI?". Another thing we can adapt from the same paper is the Control Slider so that the user can decide how aggressive the model should be when predicting the application outcome. We can also find the top features with the largest impact on the result of approving/denying the loan and one of the ways I encountered to do this is using Feature importance, an inbuilt class that comes with Tree-Based Classifiers as mentioned in this article. The display of this information would be in the form of a Feature Importance plot (the graph below). This way, it would be easier for the user to identify features that, if minimally changed, would alter the outcome.

```
In [148]: plt.title('Feature Importance')
          plt.bar(range(X_train.shape[1]), importances[sorted_indices], align='center')
          plt.xticks(range(X_train.shape[1]), X_train.columns[sorted_indices], rotation=90)
          plt.tight_layout()
          plt.show()
```



implemented HAII Heuristics
(with little nuances and edge cases)

	HAII implemented Heuristic	**Example**	**Design solution**
1	I01 Make clear what the system can do. Help the user understand what the AI system is capable of doing.	The user has to understand that this system predicts the approval/denial of home loan applications	Having a little description of what the system does on the welcome screen, also the app's name is self-explanatory
2	I02 Make clear how well the system can do what it can do. Help the user understand how often the AI system may make mistakes.	This system does not guarantee the denial/approval of the user's home loan application	Having a checkbox at the results screen where the user indicates that he understands this, and the accuracy indicator helps as well (but how well does the user understand it?). We also provide the user with the option to click on an external link to learn more about how Logistic regression works. (this is on the results page) Even though the last feature relates more to heuristic I03
3	D04 Show contextually relevant information. Display information relevant to the user's current task and environment.	Assist the user in knowing the application steps to avoid the frustration that would stem out of confusion on how to complete the application procedure	Having a brief overview of the application steps on the home screen of the app and showing the user the steps of the application at the top when he's filling out his application
4	W08 Support efficient dismissal. Make it easy to dismiss or ignore undesired AI system services.	I think since the app's goal is straightforward, the undesired service I could think of is soliciting feedback from the user	The "No, thanks" button when asked to rate on the recent predictions screen, as well as the dismissal button for subscribing to the app's newsletter on the wait screen

5	T12 Remember recent interactions. Maintain short-term memory and allow the user to make efficient references to that memory.	The user doesn't have to fill out a whole new application again if, for example, one thing changes (his income for instance)	On the home screen, users can access their recent predictions and can make edits to the application to get a new prediction
6	T15 Encourage granular feedback. Enable the user to provide feedback indicating their preferences during regular interaction with the AI system.	If the app makes a correct/wrong prediction that can be verified by the user if they apply for a home loan later, it would be very valuable to get feedback on that kind of situation to update the model	In the recent predictions page, the user is asked to rate the app, also, they can rate the previous predictions on their accuracy. I think having the rating on the results page would be not as beneficial because most users using the app haven't applied for a home loan yet and thus, what criteria do they have to rate the prediction? However, how can we ensure that users are going to come back to the app after applying for home loans to rate the predictions?
7	T18 Notify users about changes. Inform the user when the AI system adds or updates its capabilities.	If for example, we updated our model's accuracy rate, the user would want to know about that	On the waiting screen, the user can subscribe to the app's newsletter to get emails about new updates, also, we could have a pop-up notification when we update our app.
8	W07 Support efficient invocation. Make it easy to invoke or request the AI system's services when needed.	Because of the straightforward and one-dimensional goal of this app, I think just opening the app invokes this service.	

Tima Guettabi - ML assignment 2

Possible HAII Heuristics to implement with more time

	Possible HAII Heuristic to implement with more time	**Example**	**Design solution**
1	D03 Time services based on context. Time when to act or interrupt based on the user's current task and environment.	I can see how this could be a feature of this app, for example, if we have a system that scans documents uploaded by the user and it can recognize that the user uploaded the wrong one, it can interrupt them and ask them to re-check	Not sure how to do this now but the general idea is using a Document identification system and integrating it into our app.
2	W11 Make clear why the system did what it did. Enable the user to access an explanation of why the AI system behaved as it did.	We could do a better job of explaining the technicals of our machine learning model but it's still both time-consuming and hard to accomplish, especially considering that the majority of our target audience is probably not interested in learning about machine learning and predictions models and is only interested in getting their prediction as quickly and accurately as possible	I mentioned this in my idea for the design of the app but I don't have a clear idea about how to implement it, the idea is having a graph of the most important features to the least important when the system is trying to make a prediction

Tima Guettabi - ML assignment 2

HAII Heuristics I am unable to implement

	Possible HAII Heuristic to implement with more time	User need	Why it's unable to solve
1	D05 Match relevant social norms. Ensure the experience is delivered in a way that users would expect, given their social and cultural context.	Maybe the importance of features differs from one culture/place/country to another when considering whether a home loan application would be approved or not and this should be taken into account to improve the accuracy of our model	It's hard to collect the data necessary to make this kind of improvements, we need a lot of crowdsourcing to make our model flexible to different cultures and societies (for example, I've never heard of the concept of a credit score in Morocco)
2	D06 Mitigate social biases. Ensure the AI system's language and behaviors do not reinforce undesirable and unfair stereotypes and biases.	–	We've already seen in class how hard it is to have accurate models that are not biased, because often times we don't even realize that the data we're feeding our model is biased
3	W09 Support efficient correction. Make it easy to edit, refine, or recover when the AI system is wrong.		Because this is a low-stake situation, I think this is not crucial because the app isn't actually deciding who gets home loans or not but just making predictions
4	W10 Scope services when in doubt. Engage in disambiguation or gracefully degrade the AI system's		Again, the app's service is simple and straightforward so it's hard to incorporate the

	services when uncertain about a user’s goals.		ambiguity heuristic into it
5	T13 Learn from user behavior. Personalize the user’s experience by learning from their actions over time.		Same reason as above, this is not an app that the user is going to be using on a daily basis or for a prolonged period of time so personalization matters less
6	T14 Update and adapt cautiously. Limit disruptive changes when updating and adapting the AI system’s behaviors.		It’s hard to catch disruptive changes when updating a machine learning model, such as the case with the use of biased data
7	T17 Provide global controls. Allow the user to globally customize what the AI system monitors and how it behaves.	I can’t see how this could be implemented in this case	
8	T16 Convey the consequences of user actions. Immediately update or convey how user actions will impact future behaviors of the AI system.	Maybe we can give the user the choice to contribute to the development of our model using the rating of the predictions that turned out right or wrong	It’s hard to identify how using the user’s data and feedback will change our model’s predictions so it’s not clear what the consequences of the user sharing their data might do to our model