



BIN PACKING



PRESENTED TO
OR Club

PRESENTED BY
Team 6 (One&Zero)

Problematic

Adam wants to import materials with his own boat, but he needs to choose items with the best value and minimal weight. He is unsure of how to determine the optimal combination of items to take given limited space on his boat, risking incurring unnecessary expenses.

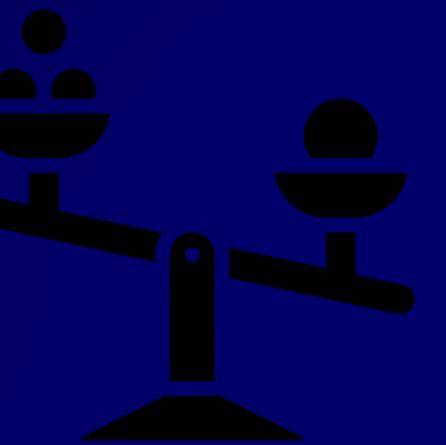
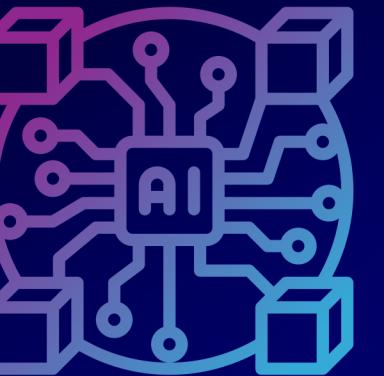
How can Adam solve this problem and ensure a successful import operation?

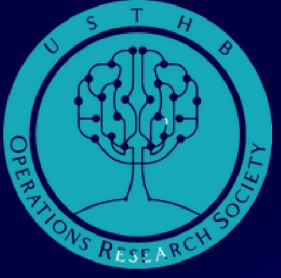




Our Solution

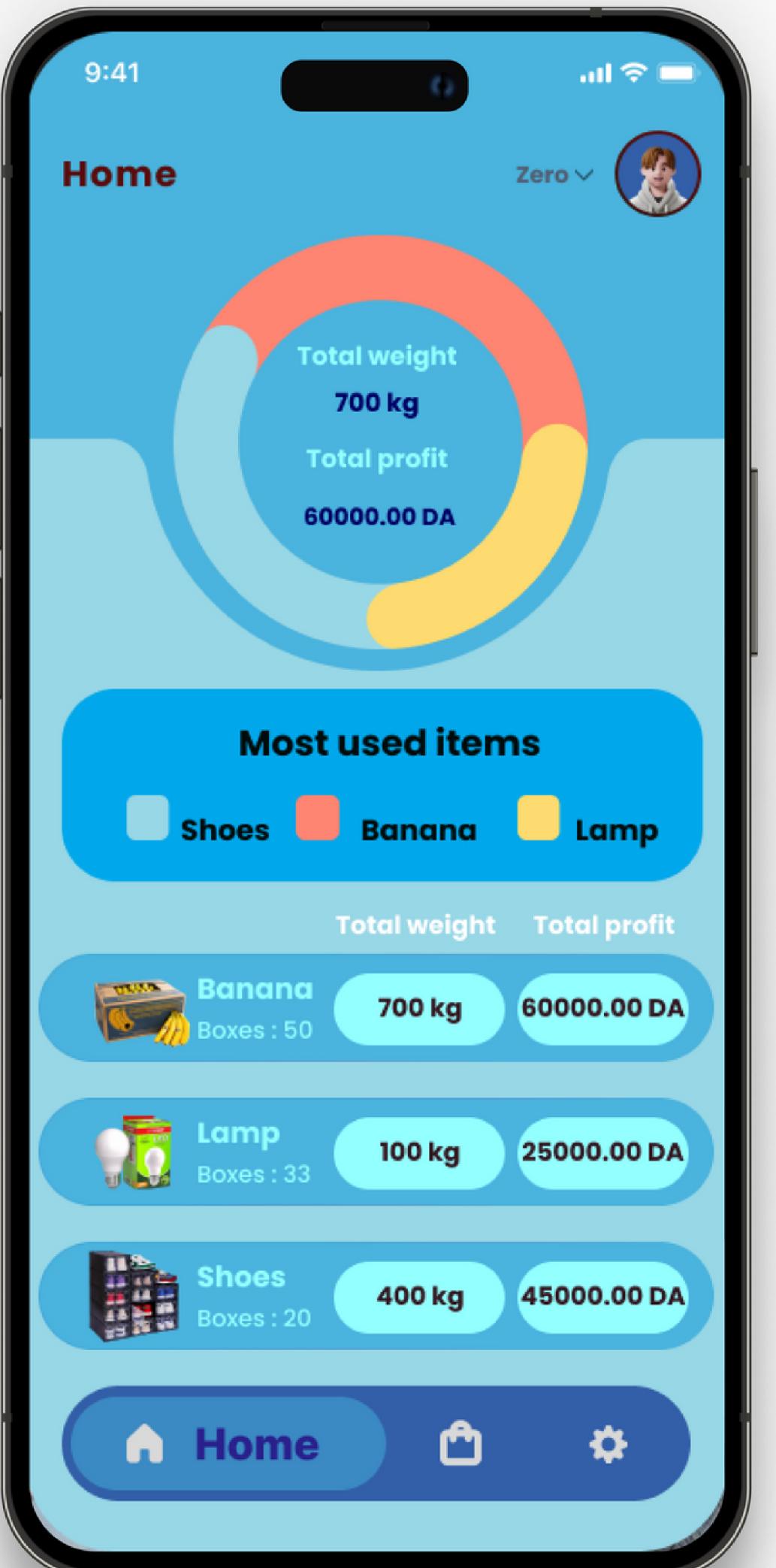
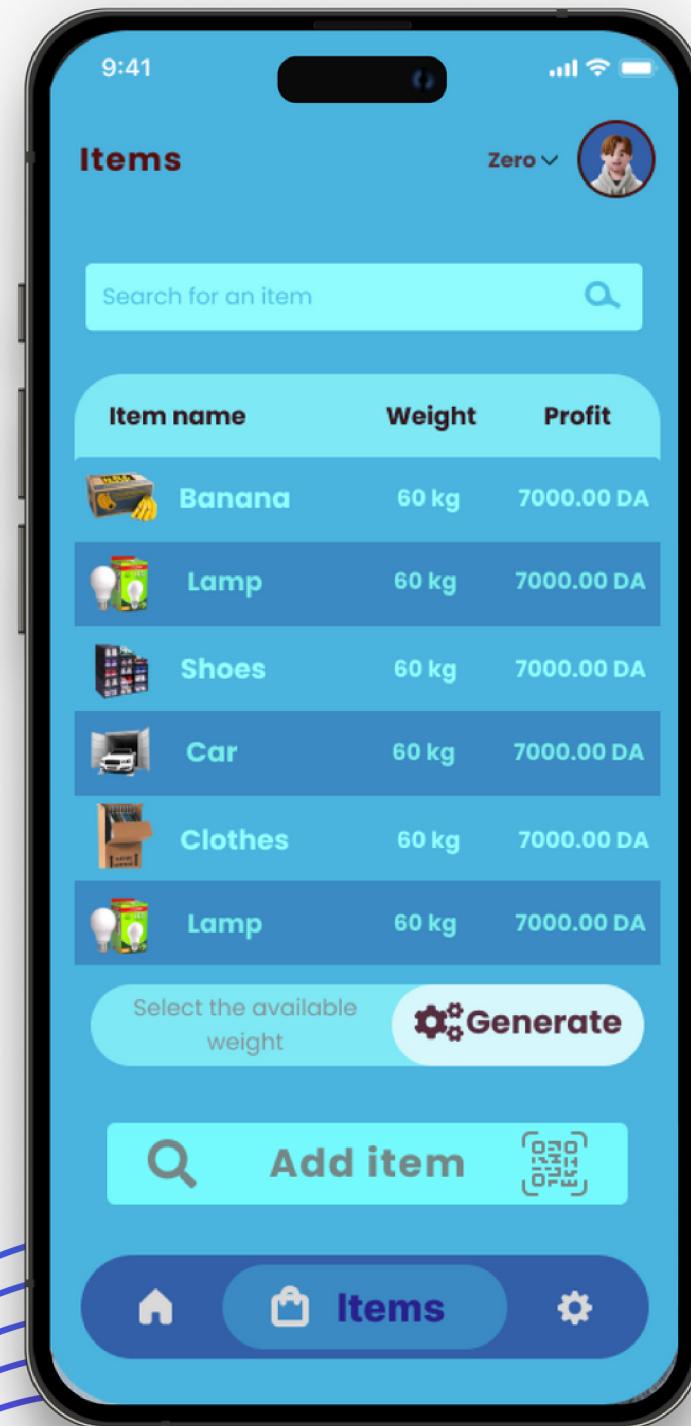
It's an app with a custom algorithm designed to help him choose the optimal combination of items. The app would consider factors such as the weight and value of each item, as well as the available space on the boat. This would help Adam maximize his profits, while also ensuring that the boat is not overloaded. By using this app, Adam can easily plan his import operation, save money, and avoid potential damage to his boat.





The Prototype





9:41

Settings

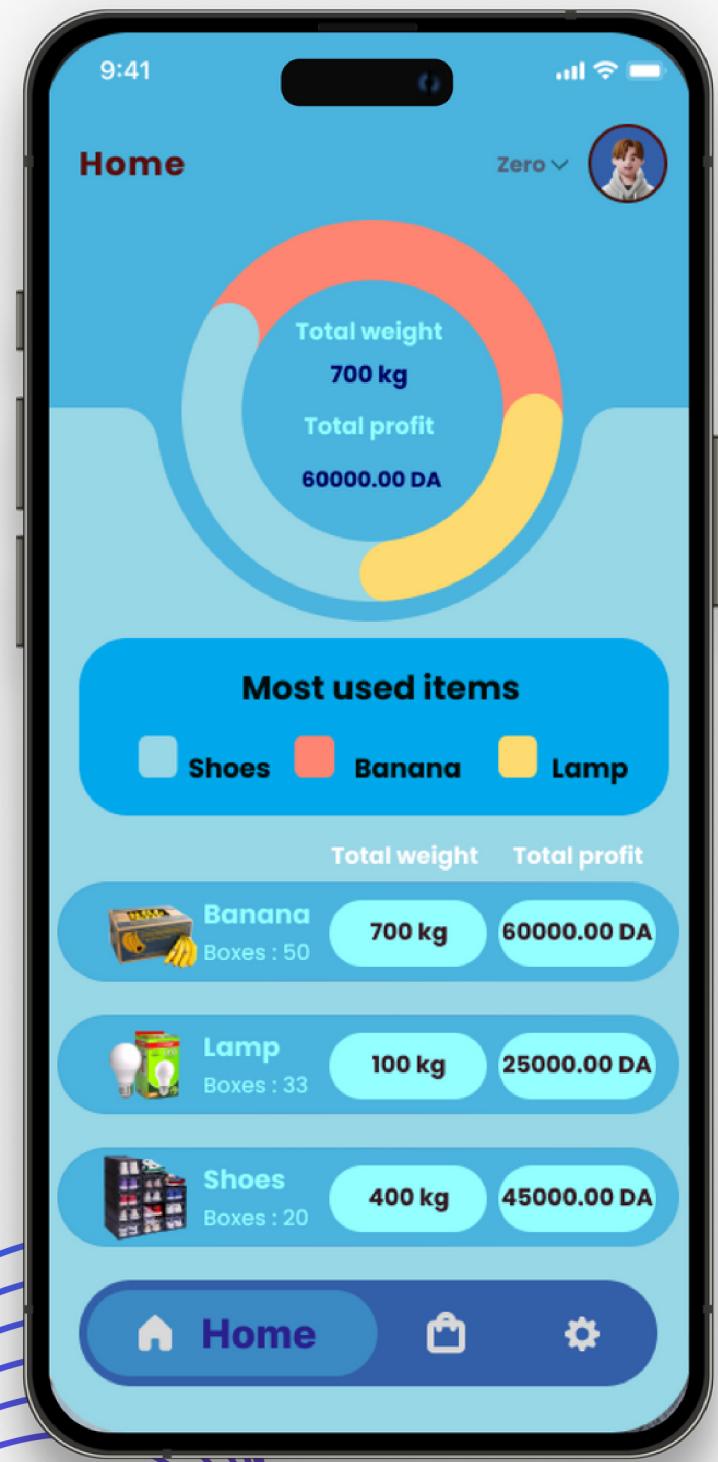
First Name: Farid

Last Name: Laoudi

Email: One&Zero@gmail.com

Phone: +2137*****13

Password: *****



9:41

Zero ✓

Items

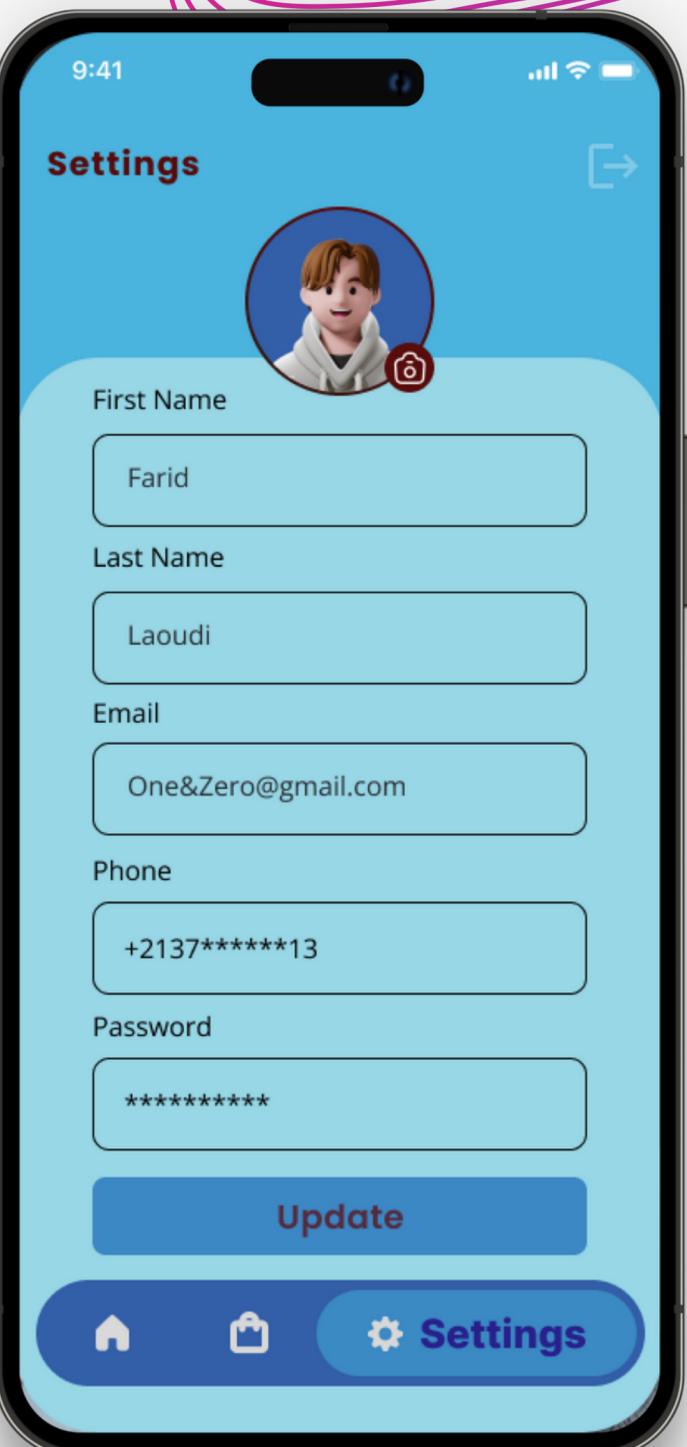
Search for an item

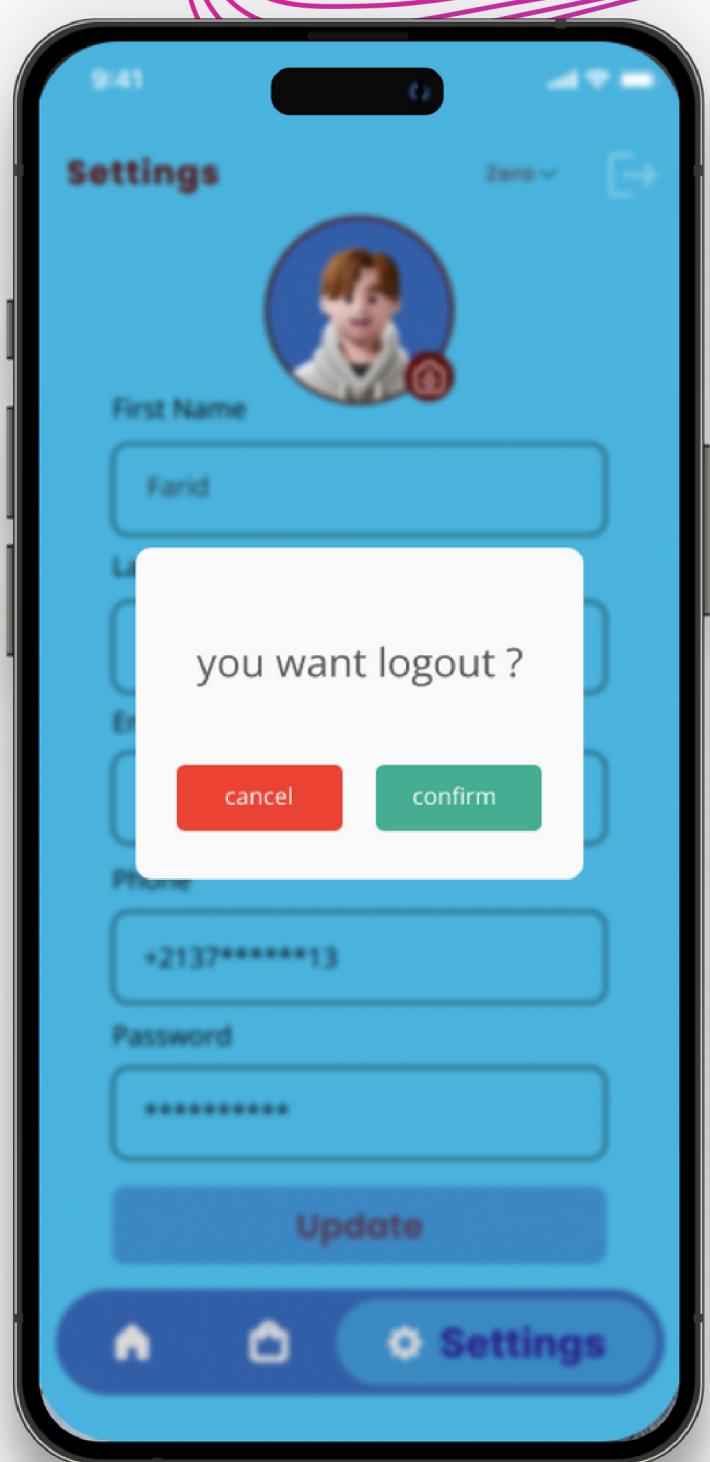
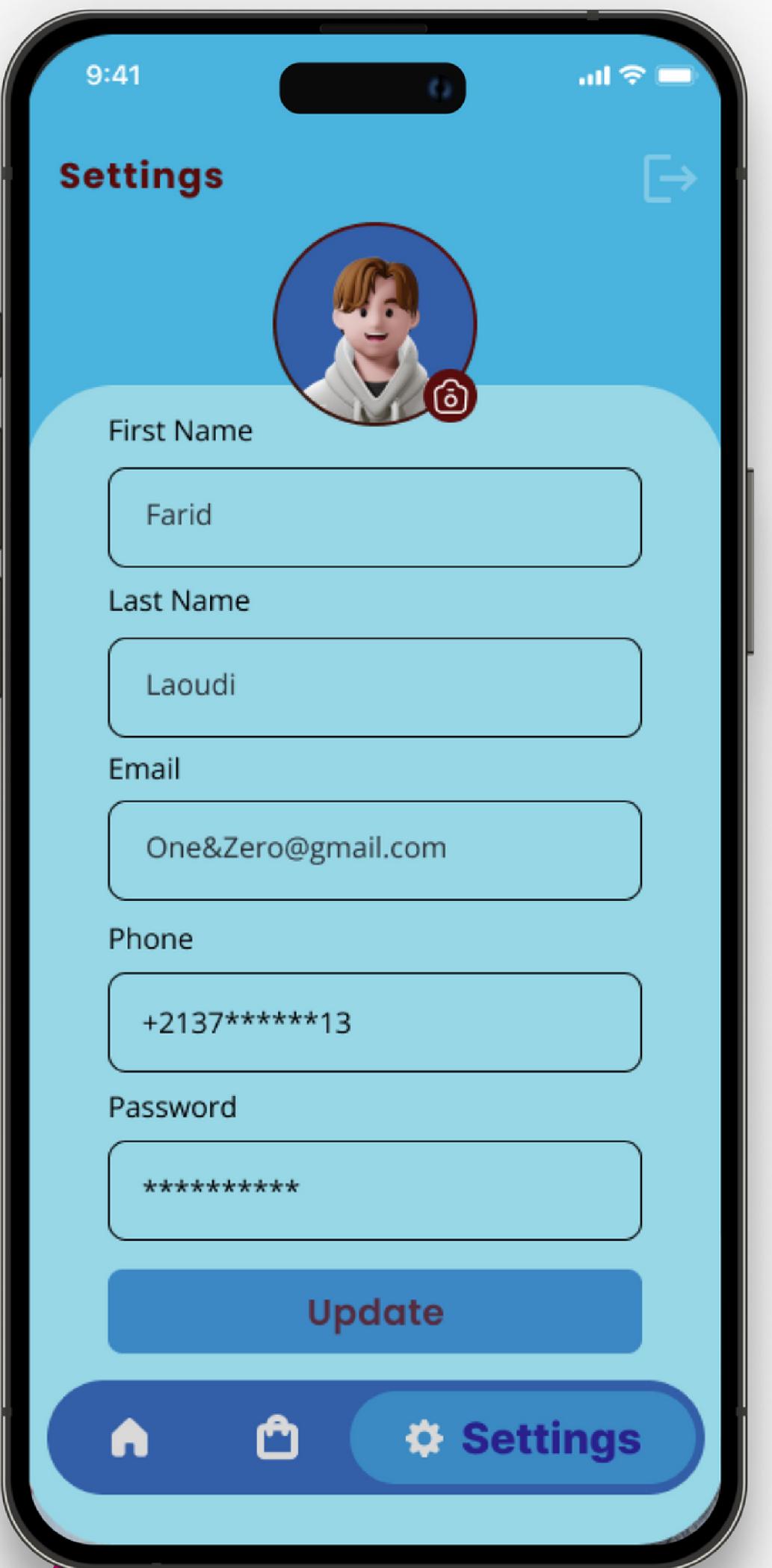
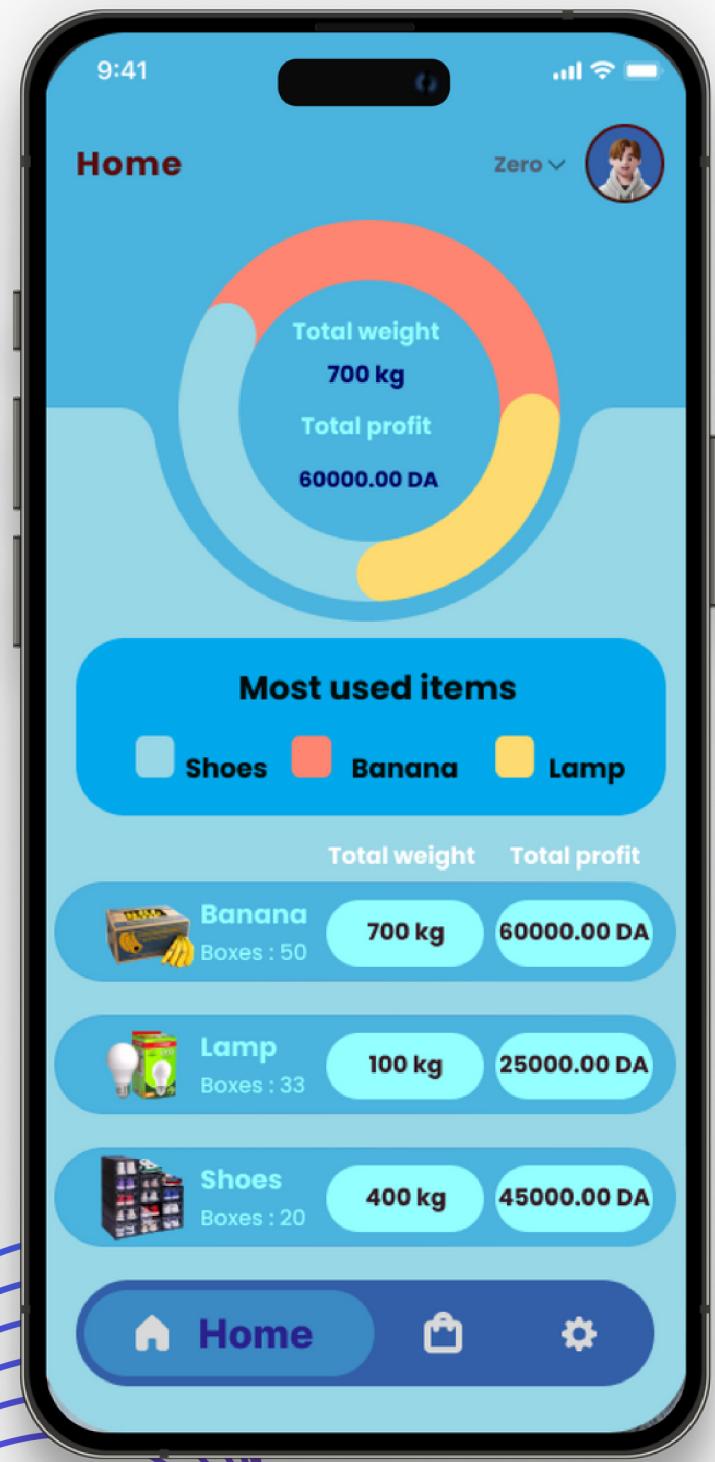
Item name	Weight	Profit
Banana	60 kg	7000.00 DA
Lamp	60 kg	7000.00 DA
Shoes	60 kg	7000.00 DA
Car	60 kg	7000.00 DA
Clothes	60 kg	7000.00 DA
Lamp	60 kg	7000.00 DA

Select the available weight **Generate**

Add item

Items





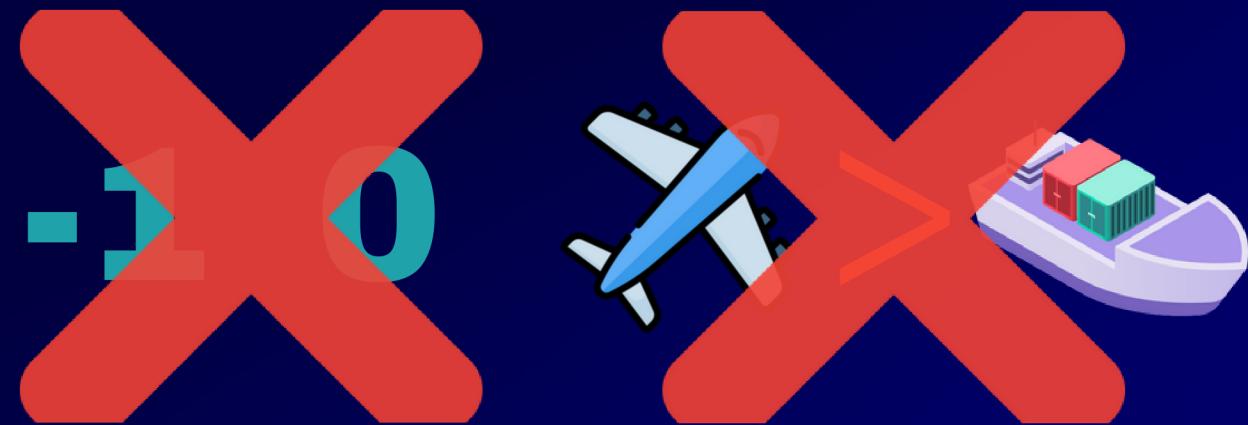
The Algorithme

- preprocessing
- To remove outliers ($\text{kg} = 0$, negative values, NaN values).

-1 0  > 

The Algorithme

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The Algorithme

- preprocessing
- To remove outliers ($\text{kg} = 0$, negative values, NaN values).
- sort the items by the ratio value/weight
- take the maximum of each time with the highest ratio



The Algorithme

- the code filters out the items .
- The loop calculates the value/weight .
- The items are sorted by value/weight descending order .
- variables k, h, and o to keep track of the total value, total weight, and the selected items in the knapsack.
- The second loop calculates how many of each item can fit based on the remaining weight limit.
- The function returns the total weight h, total value k, and string o containing the selected items and their quantities.

```

def tri(l,w):
    l.dropna
    l= l[l.weight <=w]
    l= l[l.weight >0]
    l=l[l.value >0]
    for i in range(0,len(l.index)):
        l["value"].loc[l.index[i]]=l["value"].loc[l.index[i]]//l["weight"].loc[l.index[i]]
    l=l.sort_values(by=['value'], ascending=False)
    k=0
    h=0
    o=""
    for i in range(0,len(l.index)):
        k=k+l["weight"].loc[l.index[i]]*(w//l["weight"].loc[l.index[i]])*l["value"].loc[l.index[i]]
        h=h+l["weight"].loc[l.index[i]]*(w//l["weight"].loc[l.index[i]])
        o=o+str(w//l["weight"].loc[l.index[i]])+l["object name"].loc[l.index[i]]+" "
        w=w-l["weight"].loc[l.index[i]]*(w//l["weight"].loc[l.index[i]])
    return h,k,o

```



The Algorithme

Test with Gradio

Bin Packing

object name	weight	value
	0	0
	0	0
	0	0

New row

bag weight

0

maximum weight

0

best value

0

Best Combination

Flag

Clear

Submit



Thanks !

