1855119 Haotian Yan

1.(i) (a) Non-functional

(b) The new system should reduce the risk of such errors when users input wrong information.

(ii) (a) Functional

(b) The system shall be accessed through a secure user interface requiring the user to enter username and corresponding password.

(iii) (a) Non-functional

(b) The system shall be available in majority mobile phone, tablet and pc platform.

(iv) (a) Functional

(b) The system shall deny the transaction if there is not enough credit in the account.

(v) (a) Functional

(b) The system shall stop the lift immediately in the event of emergency, if the lift is running.

2.

Assumptions: The system has a central control unit (hardware) in the room, and this unit could control all the intelligent devices in the room. The system also has a software on mobile phone and user could use the software to control the intelligent devices inside the room.

Functional requirements:

1) The system shall be accessed through a secure user interface to verify the user's identity.
2) The system shall refuse user's request if user's identity is not valid.
3) The system shall allow user to control all intelligent appliances through a central control unit.
4) The system shall allow user to have remote control of all home energy monitors over the internet.
5) The system shall allow user to check the current status of household appliances on the Internet.
6) The system shall allow user to add new intelligent devices to the system.
7) The system shall allow user to delete intelligent devices in the system.
8) The system shall update the status of intelligent devices automatically.
9) The system shall allow user to control the lighting in the room.
10) The system shall allow user to control the curtain in the room.
11) The system shall allow user to open or close the windows in the room.
12) The system shall allow user to open or close the TV in the room.
13) The system shall allow user to open or close the air-conditioner in the room.
14) The system shall allow user to adjust the volume of audio system in the room.
15) The system shall alarm user when others enter the room without permission.
16) The system shall alarm user when there is a fire or other emergency in the room.
17) The system shall allow user to update the information of him or her home.
18) The system should search the surrounded intelligent devices in the room automatically.
19) The system should allow user to set the automatic open/close time of intelligent devices in the room.
20) The system should allow user to check the current air quality in the room.
21) The system should allow user to track the pets' movements in the room.

Non-Functional requirements:

Product requirements:

Security:

1) The system shall restrict access permissions for the system data.
2) The system shall ensure passwords shall never be viewable at point of entry or at any other time.
3) The system shall encrypt the login password when sending data to database authentication to guarantee the rights of the users.
4) The system should record each unsuccessful attempt by the user to access an item data on an audit trail.
5) The system shall not allow users that don't have permission to change the system data and any such attempt shall be reported to the security administrator.

Availability:

6) The system shall be available for use 24/7.
7) The system shall be available on mobile phone.
8) The system should achieve 99% up time.
9) The system should present users with a notification that the system is unavailable unless the system is non-operational.

Efficiency:

10) The system must ensure the restart cycle must execute completely in less than 100 seconds.
11) The system must ensure any interface between a user and the system shall have a maximum response time of 5 seconds.
12) The system must be able to process a request in 3 seconds or less.

Reliability:

13) The system must disable a user's login for 5 minutes after 5 unsuccessful login attempts.

Usability:

14) The system must be able to be used by the general public without training.

Organizational requirements:

Maintainability:

15) The system must maintain a service log and check for system service expiration at system start-up.

Flexibility:

16) The system should make sure that the text that users might see must be modifiable without changing source code.
17) The system should have multi-language support without the need for additional components.

External Requirements:

18) The system must be possible to upgrade from any previous version to the main system when a new version of the main system is released.
19) The system must not modify existing configuration values when upgrades are installed.

Prioritise functional requirements (Urgency):

- High: 1), 2), 3), 8), 9), 10), 11), 12), 13)

Some of these functional requirements are associated with user's identity security (1, 2), and others are basic requirements of the whole system. User won't choose the system if the system can't ensure itself security, for example, some people could enter or control this system without correct identification and permission and this will cause serious consequences. 3, 8, 9, 10, 11, 12, 13 are the basic functions of this system, including all the common electrical devices in the house. These requirements are critical and need to release in next version.

- Medium: 4), 5), 6), 7), 15), 16), 17)

These requirements also support necessary system functions, but they are not so crucial and could be released later if necessary. Because if the system doesn't have this function, it is not complete, for example, in our assumption, user could use the software to control the intelligent devices inside the room, so the status and control must be available through the internet (4,5). 15 and 16 are about the safety of user's home, so it is also necessary, but without these functions temporarily, it is also a basic smart home system. 17 is also needed because the user may change the relevant information of home.

- Low: 14), 18), 19), 20), 21)

These requirements could enhance the quality of the system, if the resources permit, they could make the system more convenient and humanized. Not every user has a audio system in his or her room, so 14 will be nice to have but it is not necessary; 18 could make the system better because user don't need to add or delete them manually, but it is also not necessary, because user could add/delete devices by themselves (requirements 6 and 7). 19, 20, and 21 are secondary functions that could also make the system better, but are not necessary.

Prioritise non-functional requirements (Urgency):

- High: 1), 2), 3), 5), 11), 12), 13)

1, 2, 3, 5 and 13 are non-functional requirements that ensure the user's information security so they are crucial and must have in the original version. 11 and 12 are also critical because it will seriously impact user's experience without these requirements.

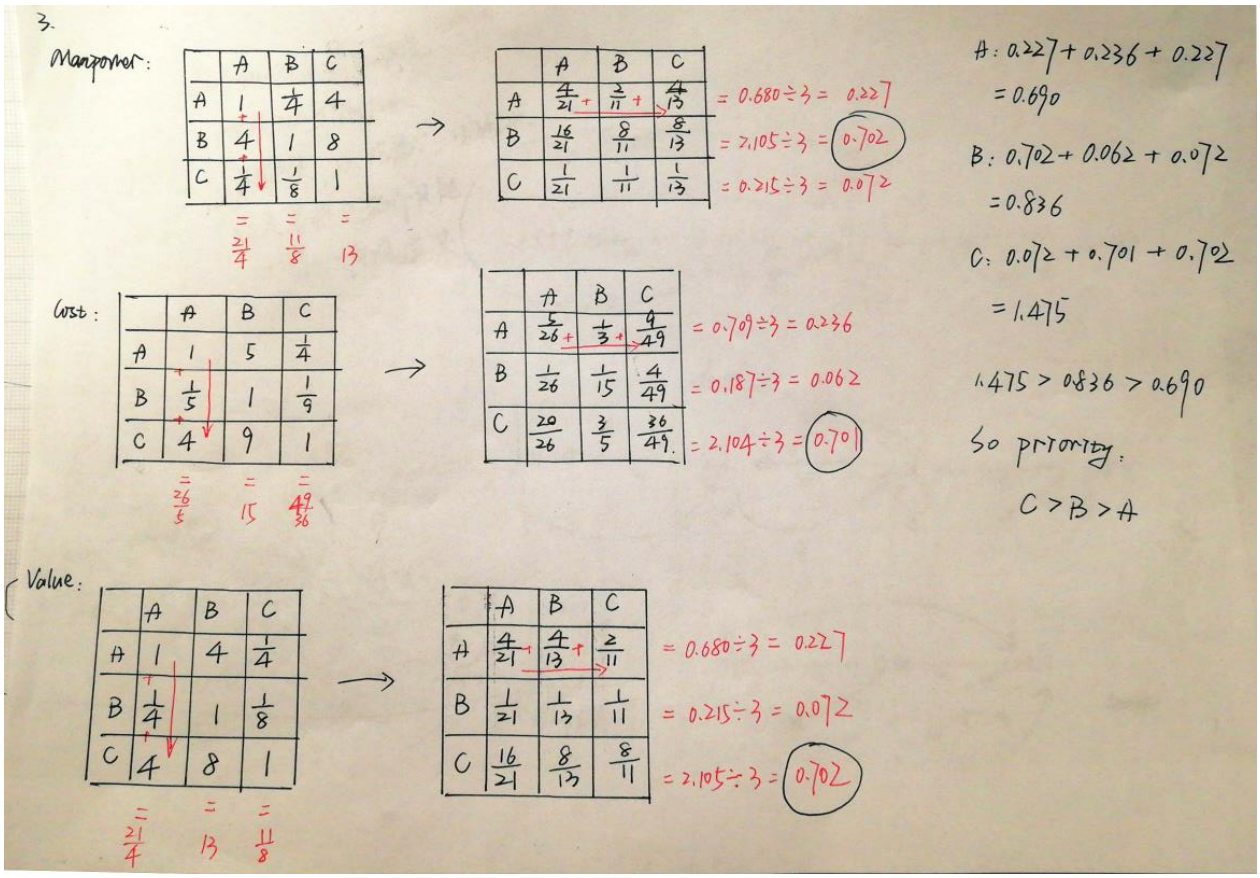
- Medium: 6), 7), 10), 15), 16), 18), 19)

6, 7 are also our necessary needs which satisfy our assumptions, but the system could not have a mobile software in the original release and this could be released later. 10 is also important but the restart function is not used very often so it could be released later. 15, 16, 18 and 19 ensure the maintainability, flexibility and external requirements of the system, which are also necessary but could wait until next release.

- Low: 4), 8), 9), 14), 17)

Without these requirements, the system is okay; but if the system have these requirements, it will be better. These non-functional requirements could enhance the user's experience and make the user more willing to purchase this smart home system.

3.


3.
Manpower:
Cost:
Value:
A: 0.227 + 0.236 + 0.227
= 0.690
B: 0.702 + 0.062 + 0.072
= 0.836
C: 0.072 + 0.701 + 0.702
= 1.475
1.475 > 0836 > 0.690
So priority:
C > B > A