Solver: Joshua Tan

1) a) Life-critical

b) In a word processing application, the **rate of error** should be kept as low as possible. However, there's the option of "undoing" the action should such an error occur. In the case of the smart home system, an error could result in the senior citizen either receiving incorrect/conflicting instructions or not receiving medical help on time. This could consequently lead to death – a result that is generally irreversible.

Similarly, while having a high-**speed** word processing application is ideal, it is not essential (productivity negatively affected). The smart home system, on the other hand, requires that vital signs be sent to the emergency response operators in the shortest time possible. In many emergency cases, the sooner treatment is provided, the better the chances of recovery and survival.

c) One aspect of design to consider would be the **format** of information that's being displayed (e.g. date/time, weights/measures). The emergency response operators should be able to read data in a unit familiar to them (metric/imperial) in order to properly determine the correct course of action to take.

Another aspect of design to consider is that of **product naming**. Naming the product "Smart Home 444" isn't going to sit well with some Chinese users since "4" is looked upon as an unlucky number. In order words, it is important to be sensitive to the feelings of the people in each market (i.e. cultural sensitivity).

d) Surveys can be conducted to obtain feedback on **subjective satisfaction** on the part of both the emergency operators (ease of reading & interpreting data) and the elderly users (comfort & ease of maintaining equipment).

The **speed of performance** should also be measured: the time it takes for the alert to be transmitted (initial & completion timestamps), the time it takes for the vital signs to be detected (how long before the sensors detect a stroke, for example) etc.

e) Daily use tasks are common (often used) and important. Necessary use tasks are those that are not very frequent. Edge case tasks are those that are rarely used but still necessary (e.g. for repairing tasks for errors, configuration etc.)

f) Daily-case scenario: Operator checking the indicator to see if the system is transmitting data.

Necessary-case scenario: Operator/medical professional checking the patient physiological vitals history to analyse general wellbeing.

Edge-case scenario: Technician configuring the system for the first time enters and saves the details of the elderly user (e.g. height, weight, name, identification number).

2) a) Example of Human Computation: Amazon Mechanical Turk harnesses human crowdsourcing power to accomplish tasks (see

https://www.mturk.com/mturk/welcome[1]). Examples of tasks include transcribing audio tracks and identifying specific images from a composite photograph.

Example of traditional Human Computer Interaction: Using a computer program to evaluate the sum of the first thousand prime numbers.

*N.B The author **assumes** that "Human Computation" refers to the harnessing of human computational power to solve problems that computers would first challenging to solve. The reader is advised to check with more authoritative sources.*

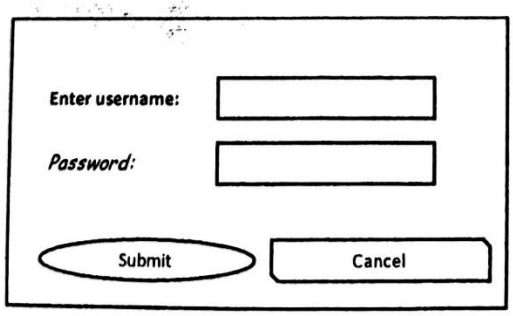
b) "Gulf of execution" is a mismatch between the user's intention and the allowable actions. This can occur in stages 2-4 of the Action theory.

"Gulf of evaluation" is a mismatch between the system representation and the user's expectation. This can occur in stages 5-7 of the Action theory.

c) At stage 2, the user forms his intention. For example, once the user has determined that his goal (Stage 1) is to paint the cat's head green, he will then proceed to determine (stage 2) that he'll use the paintbucket tool instead of the brush.

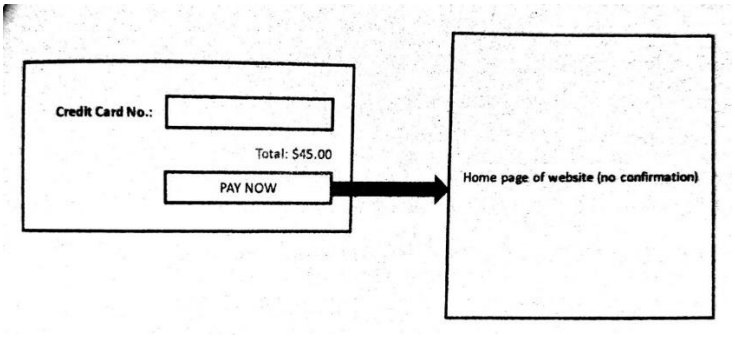
At stage 3, the user specifies his action. Continuing with the example stated above, the user determines that in order to paint the cat's head green, he'll have to click on the "paint bucket" icon before clicking on the cat's head.

d) "Strive for consistency": Consistent sequence of actions for similar situations. (e.g. identical terminology in menus, consistent visual layout). Example of rule violation (inconsistent visual layout) below:



"Design dialogs to yield closure": Action sequences should have a beginning, middle, and end. Feedback provides a sense of accomplishment. Example of rule violation: no clearly defined step-by-step process; after buying something from an online store, there is no confirmation message.

[1] Last accessed: 05 August 16



3) a)

Scenario	Dominant sense(s)
I	Smell, taste
II	Sight, hearing
III	Touch (tactile feedback), hearing
IV	Sense of balance (Equilibrioception)
V	Sense of one's body position (Proprioception)

b) i) The principle states that human can remember 5 to 9 chunks of information (with "chunks loosely referring to a cluster of items). The special code comprises a set of 12 letters (or 12 chunks since the letters do not seem to follow a pattern); it's difficult to remember the code since 12 > 9.

ii) MS-REW-DQ-WUA-OF. By using dashes to split the set of letters into groups, we reduce the number of chunks the user is required to memorise from 12 to 5.

iii) A mnemonic maps concepts to easily remembered constructs. For example, one could come up with a creative sentence with words that map to each of the letters of the code.

c) Iconic communication is intentional communication done via visual imagery. Examples: using a tissue packet to reserve a table, or using a human skull icon to indicate danger, or using a series of illustrations to show passengers how their lifejacket should be worn.

4) a)

	Scenario A	Scenario B
Physical size	Small – needs to be mobile	Large – viewers > 2m away
Pixel density	Higher – screen is closer to eyes, more pixels needed per inch to prevent eyes from differentiating pixels	Lower – screen is further from eyes, less pixels needed per inch
Viewing angle	Smaller – video is watched by 1 person	Larger – video is watched with family, each seated at different positions. Viewing angle has to be larger so that each family member can watch the video with reasonable quality

Brightness	High peak luminance – light shining through bus window necessitates that the screen is bright enough	Lower peak luminance – the room is dimly-lit
Black level	Higher black level is fine because of the brightness of the surroundings	Lower black level. In a dimly-lit room, lower luminance of black pixels will make the viewing a more pleasant one

b) i) Idioms are widely used actions that feel "natural" but have no physical meaning. Metaphors are computer interactions that map to real-world interactions that users are more familiar with.

b) ii)
- Metaphor. Dragging file icons onto a folder icon maps to the real-life action of moving paper documents into a folder.
- Idiom. Pinching a real-life photograph does not make it smaller – it only adds creases to it.
- Idiom. There is no real-life shortcut for copying of items.
- Metaphor. Collecting multiple orders within an online shopping cart maps to the real-life action of placing items into a shopping cart (trolley).

c) Widgets are well-established idiomatic GUI components. A widget library can contain elements such as buttons, sliders, textboxes, checkboxes, etc. This allows designers to think with a higher-level vocabulary of widgets rather than in terms of pixels and/or low-level input.

--End of Answers--