Solver: Zeng Jinpo

1)   a)   No, the recommendation is not good as this application is considered **life-critical system**. It is a life-critical system as it is used to deploy volunteers to locations struck by natural disasters and someone's life possibly depends on it. The requirements for a life-critical system is to be reliable, effective and has error-free performance. The open-source application, although helps to reduce cost, has not been properly tested, hence, it might not be reliable especially during critical times. Reducing cost should not be an important requirement for a life-critical system.

   b)   No, this design does not have good usability. Reporting an injured person is a frequently used function in the system and considered a daily use task. A daily use task should be easily found and accessed by the user. If the function is placed at the bottom of a multiple level drill-down menu, it would not be easily found and cause frustration to the user.

   c)   • Internationalization could be achieved through allowing the users to choose between different date time formats, i.e. little-endian: dd/mm/yyyy, middle endian: mm/dd/yyyy and big-endian: yyyy/mm/dd.
       • Another way is through providing conversions between different weights and measurements, i.e. kilograms to pounds, centimetres to inches and vice versa.
       • Lastly, allowing the users to enter the identification number of disaster victims based on their nationality, i.e. social-security number, national identification or passport numbers

   d)   • For the measure "time to learn", Eric can make a list of relevant tasks that the users could learn. One of such task can be reporting an injured person at a specific location. For each task, the users will need to figure out how to accomplish that task and they will be timed. The lower the time taken to learn, the more effective and efficient the system is.
       • For the measure "error rates", Eric can conduct his evaluation with the measure "time to learn', where him and his team notes down how many and what kind of errors were made during the execution of each task, ne
       • Lastly, for the measure "retention time", Enc should send the users back and invite them again in a week's time. For the second evaluation, the users will be made to do the list of tasks again without any guidance, This time, Eric can observe how well do users maintain their knowledge after a week.

2)   a)   The similarity in design consideration for the elderly and children is that the system should be able to reset back to its original state easily. Instruction of error messages are not useful as children might not understand while might cause anxiety to the elderly as they do not know how to amend their mistakes.

The difference for design considerations between elderlies and children is that children like exploring and hence do not mind making mistakes. However, for the elderly, they prefer things to be simple and to make no mistakes. Another consideration is that children like familiar characters and repetition while the elderly might not appreciate that.

b)
- "Forming the goal" is the user imagining what they would like to achieve at the end. An example could be turning on the hot water to shower.
- "Forming the intention" is choosing how you would approach the end goal with the available resources. An example could be turning the lever for the hot water to the right instead of using the knob.

c)   The gulf of execution could occur. The gulf of execution is the mismatch between the user's intention and the allowable actions. In order to ensure that the system is able to fulfil whatever tasks or tools the user would like to use, the designer could conduct usability studies. In these studies, the designer should note down what are the tasks that the users would like to carry out on the system and how they would prefer it to be done. The studies should help reduce the possibility of gulf of execution by removing roadblocks and steps that cause extra thinking.

d)
- In figure A, the field for "Buyer's Name" did not indicate if it was the buyer's first of last name or both. This might cause the user to incur more errors than reducing or preventing errors.
- The field "Buyer's Gender" is an open-ended text box, but it should be a dropdown list to prevent the users from entering the wrong information.
- The "Buyer's Date of Birth" field is segregated into three but it did not indicate which box is for which part of the birth date i.e. DD/MM/YYYY, MM/DD/YYYY, YYYY/MM/DD.
- The "Credit Card Number' field did not specify if the dash between the numbers should be included or excluded.
- Lastly, the form only includes a "Pay" button but not a "Cancel" button, restricting the user and allowing them to only pay but not cancel. This confines the user, not permitting them to reverse their actions.

e)   The pop-up box violates the rule of offering informative feedback. The message on the box did not mention if the payment was indeed successful, or verify how much was paid successfully. Additionally, the other rule flouted was permitting easy reversal of actions. It should, instead, display a non-editable form with all the information that the user has typed in to ensure that they have one last look before submitting the form. If the user spots any error, there should be a 'Back' button for them to go back to the editable version of the form to make any amends.

3) a) i) • Lateral localization, or left-right localization, is using both ears to listen to a sound. For high frequencies, the loudness difference can be heard between both ears while low frequencies, there is an envelope time shift between ears.

• Sagittal plane localization is using one ear, or monaural to listen to a sound. The folds in the pinna creates a frequency notch filter called the pinna notch. Different sound directions cause different specific frequencies to be suppressed. The auditory system estimates the direction by detecting which frequencies are suppressed.

Editor's note: Lateral localization answer has been modified as the old notes contained errors so this answer reflects the new, updated notes.

ii) By varying the volume as a softer sound implies that the sound source is at a further location. The next way is to vary the volume between two earphones. Whichever side has the louder sound implies that the sound source is from that side.

b) The two other senses that are engaged in 4D rides are smell and touch. For the sense of smell, the theme park ride could spray scents into the theatre at significant scenes. An example would be the 4D film at Walt Disney world, at the scene of Beauty and the Beast where there were stacks of food on the table. For the sense of touch, theme parks could include short gusts of wind or splashes of water at appropriate scenes. An example would the 4D ride at Universal Studios Singapore where there were short gusts of wind at spooky moments and water sprayed on the audience's face when the donkey sneezed.

c) i) Fitt's law was modelled to calculate how quickly a person can point a target on a table. T is the movement time from point A to point B, D being the distance needed to move from point A to point B, W is the target's width, a is the-start or stop time constant which is device dependent while b is the inherent speed constant which Is also device dependent.

ii)
$$T = a + b\log_2\left(\frac{D}{W} + 1\right)$$

$$1000 = 400 + 250\log_2\left(\frac{D}{3} + 1\right)$$

$$\log_2\left(\frac{D}{3} + 1\right) = \frac{1000 - 400}{250}$$

$$\frac{D}{3} + 1 = 2^{2.4}$$

$$D = 3(2^{2.4} - 1) = 12.834 \text{ cm}$$

4) a) Single-letter recognition:
    - useful when there is limited space for handwriting
    - helps novice users new to writing with stylus to practice handwriting
    - single stroke means no pen lifts in between, causes distress at some letters e.g. B which needs more than 1 pen stroke
    - writing letter by letter is tedious and tiresome

    Word/phrase recognition:
    - type out sentences faster, reduces time needed instead of having to write one letter at a time
    - users do not need to learn how to write in a specific manner but are able to use own natural handwriting
    - unique handwriting leads to system being unable to detect the phrase written leading to frustration
    - input system may not be able to recognise spelling errors

    Editor's comment: Spelling errors is a problem common to both methods, so it may not be accepted. What should be mentioned is a con of word/phrase recognition which is absent in single-letter recognition, such as requiring large amount of space to write the whole word/phrase.

  b) - Sovereign means that it monopolises the user's attention for an extended duration – most major applications are sovereign
    - Transient posture means that the software briefly captures the user's attention from time to time, such as sidebar gadgets and chat notifications
    - Daemonic posture means that the software is mostly silent and very rarely captures the user's attention, such as network and volume icons in system tray

  c) i)   1, 2, 3, 4, 3, 9
    ii)   1, 2, 3, 4, 3, 4, 5
    iii) The system displays an offer for a set meal for the pizza but the user declines the offer, choosing to stick with the original order of Chickdoo pizza.

<center>--End of Answers--</center>