

Q1)

a)

The first I chose is smart farming. it is a modern method as it is using the IoT, automation, sensors, and robotics to do farming work which is conventionally done by human.

It is the future since modern technology help in predicting the best seeds quality according to soil and nutrient requirement. It also helps in making the right decision for maximum yield of crops. World population is going very high so we need lots of crops to yield to ensure worldwide food security.

Smart farming is indeed going to be must to have. However, there are some pushing factors such as:

- 1) internet connectivity issues in far-flung areas where farms are mostly located
- 2) skill to operate and maintain
- 3) high initial installation cost
- 4) availability of masses

b)

The second is building automation. This technology is booming since major internet companies are actively pushing their devices in to the market. It is getting highly popular especially in urban areas and building complexes. It is useful and excellent when it comes to the safety and security of the building and its premises.

However, there are pushing factors which limit its growth. For example, it needs regular internet connectivity and the installation cost is high while real-life fluency is not satisfactory, it works as a hit and miss approach. If you want to switch on the light either you say it using a voice command or using the navigation panel on your smartphone. The problem with voice recognition is that it is not reliable it may work or simply need to command several times.

Same goes with software security in case of virus or hacking entire home can be controlled remotely, many building automations gives false positive, so overall building automation is gaining market but yet to win trusts in the common household as regular installation. It is the future and currently it is being developed.

Q2

a)

It is totally agreed with this point of view because there are a lot of examples that many people have created and many things that are taken apart from the video games such as vehicle design that is actually taking from video games.

Coming into the point, the available technologies or tools from the above story are embedded systems which comprising of many components where all serve a specific function and allowing the system to take input from the player and relay the outputs on a screen display. Embedded systems are used for better improvement of games.

At the present day, the video games console uses the following embedded system components:

1 CPU

2 RAM

3) GPU

4) AUDIO OUTPUT

5) VIDEO OUTPUT

6) USER CONTROL SYSTEM

7) OPERATING SYSTEM

Micro chips are generally used as a booster like for increasing the performance of the computer

Atari : is a video gaming company as it produced educational software for the microcomputer

Processor:

A processor can be generally defined as the integrated circuit that makes almost all calculations that run in a computer, this will perform operations like athematic and linear algebra. The higher the processor the higher the performance of the computers.

b)

1)

Arduino is one of the most micro controller used in gaming . That is because easy to program and easy to integrate and operate with other components . In this game I made, I tried to used most of chapters in embedded system course as much as possible to turn my knowledge into physical existing project. As I used different input and output liker push buttons, LEDS and speaker. And different communication protocol like UART using bluetooth module and Lcd using I2C protocol . In addition to that, I designed a small slider crank mechanism and attached it to the servo to push the gift and work as vending machine. The video will show everything more clearly.

Game description:

The game is basically a memory game. The user will try to follow the sequence of lights using 4 pushbutton that appears on the four LEDs which is being generated randomly . In other word, some LEDS will be high for just few milli second and then turned off all waiting for the user to match the last sequence .

If user managed to make the first round , the lcd will display his score on the second line where the first line will store and display the highest score he gets.

If he failed to get the right sequence in any rounds, the massage will be displayed in lcd which is “ game over , press any button to play again” . So if user pressed any push button again the game will be repeated and the highest score will remain the last until breaking the record and so on .

If the user win, he will get a gift through vending machine using servo motor that attached the slider crank mechanism which i designed to push the gift to the user if he won.

The user will win if he managed to match the right sequence for continuous 5 rounds and then a massage will be displayed to lcd which is “ Congrats! Send 1 to get ur gift”

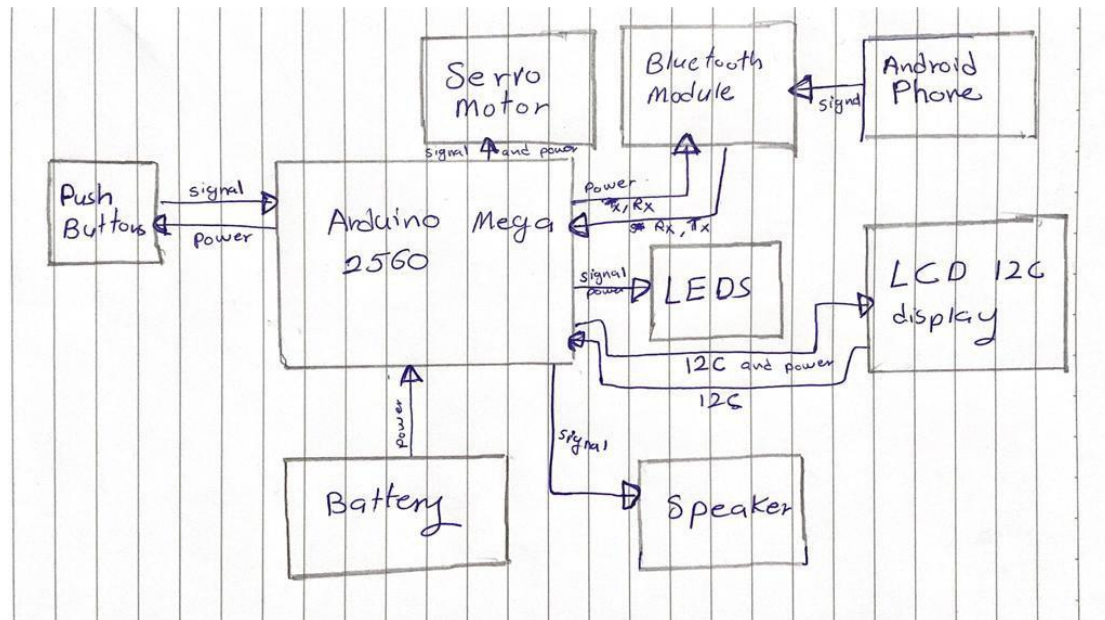
Basically this part where the user will send a command from the phone using bluetooth module . The command is number1 , if its send, then he will get the gift. (this part to show my capability of using different ways of communication).

The uniqueness:

I found this game is so unique in different ways. Firstly, the game provide a gift for the user if he won through the mechanism attached in the servo motor as I explained earlier. Moreover, The game is interactive with other device using bluetooth module. In addition to that, the speaker that display different tones based on the user situation whether he won or he lost which made the game more interesting. The variable that keeps the records on LCD until breaking next record also make the system unique.

In addition to all of that, memory game is not only fun a game, but it is also a good training to your memory as the user can improve his memorization ability when he plays more as the more rounds he reach the more difficult the game become.

2)

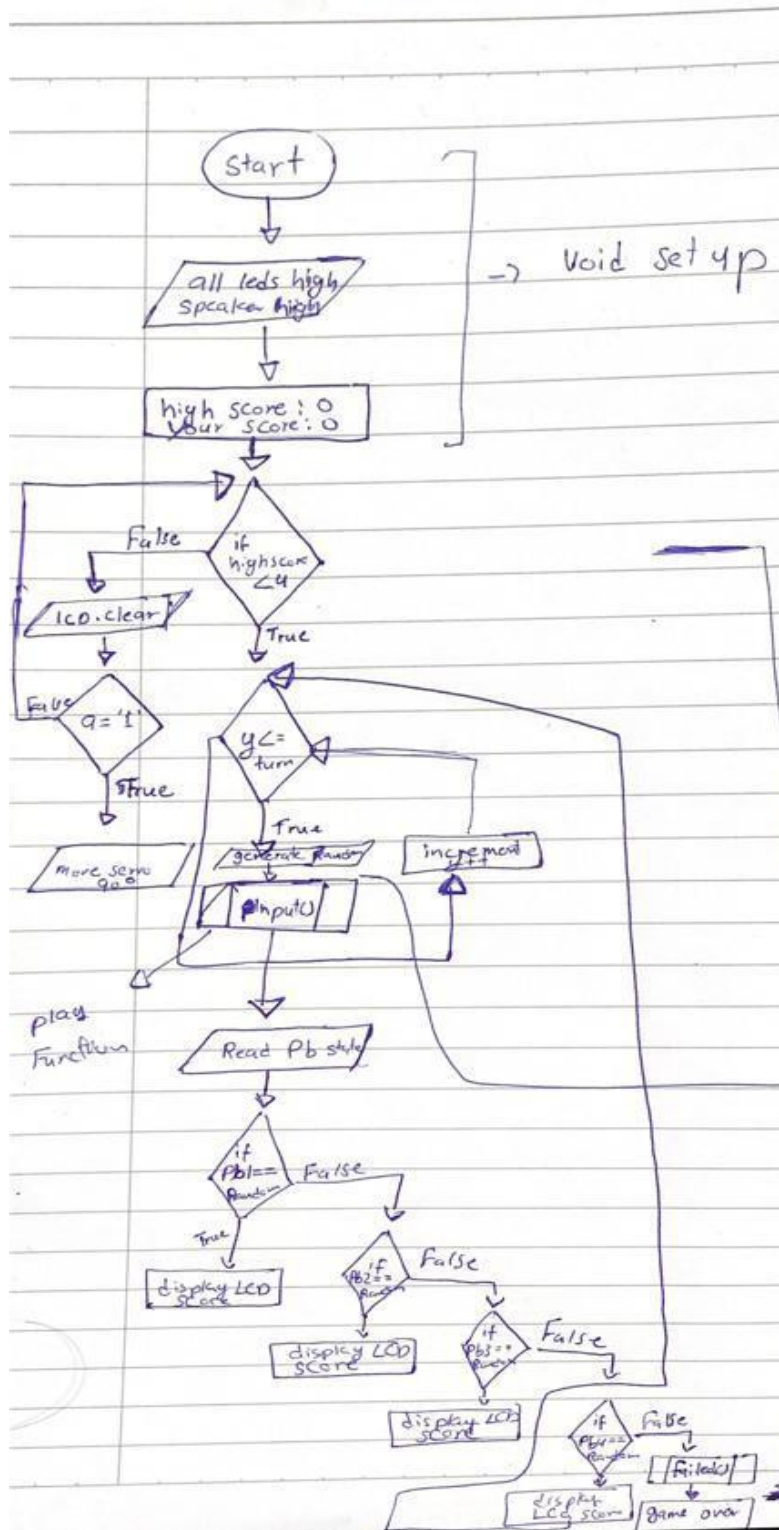


Interpretation:

1. Arduino is the brain of the system where it is operated by 9 v battery .
2. All components are powered by Arduino thats why for the input pushbuttons there is another arrow inside it to represent the power .
3. The Arduino will get the inputs signal from different four push buttons . Based on the programing conditions, the 4 LED will receive signal to match to be matched with the push buttons input.
4. Different tones will be displayed from the speaker based on different conditions in the brain Arduino.
5. The LCD I2C is bidirectional communication and it is noted by two arrows . It is used to display the game state and result.
6. If users win, a command will be send from android phone through bluetooth module which is also powered by Arduino and using UART protocol serial communication.
7. The servo motor will be activated if users win and send command to bluetooth module as PWM pin will send signal to servo .

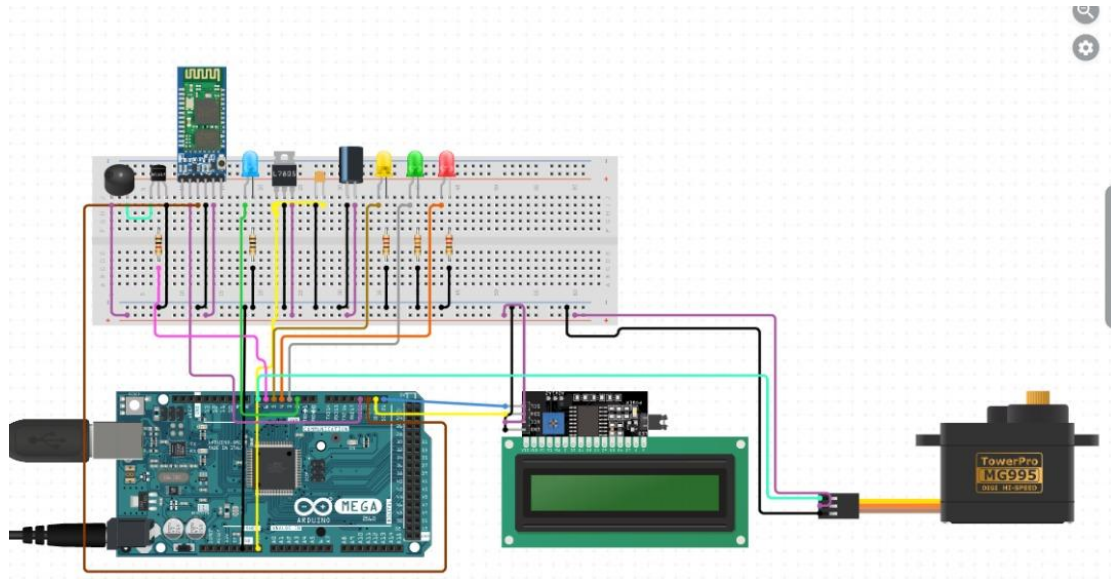
3)

the general flow chart of the system . Since the system has so many conditions, it is easier to see the code because it has comments in every line



4)

The circuit diagram of the system



5)

Programming codes with the comment and video is attached in gitub under file final exam

And also attached to the email.

6) the video link is attached in github under file final exam

7) System limitation and recommendation:

As for the limitations, the overall system housing is not properly attached due to limited amount of material used as there is a need a better housing design and fabrication. Secondly, the game can only be played by 1 player a time . In addition to that, the system need to have a better power source than battery since battery is insufficient for all the component I used. Lastly, the box which has the gift is limited to only one gift due to limited space.

As for recommendation, it is highly suggested for this game to have better frame design where all components can be placed nicely and rigidly. Moreover, the game can accept

more than 1 player to play and compare between their result . In addition to that, the number of gifts can be increased and also can be more various to different type based on the score obtained by the user. Lastly , the user can have hand console to use which is more comfortable and exciting better than normal push buttons.