OBI-OBUOHA ABIAMAMELA

MECHATRONICS ENGINEERING

18/ENG05/040

STRUCTURED PROGRAMMING ASSIGNMENT

Creation of A Web Page To Help Fight Against The Corona Virus Pandemic.

In the design and implementation of such a project, steps have to be followed and these steps are the software development processes.

In the initial stage, there is the **Conceptualization**.

In the modern world, the corona virus has had a big deal of an impact and its spread has been very rapid. Therefore there's a need to create a form platform that allows the user to quickly check/ test himself for infection. In doing this, the spread would be completely slowed down to the barest minimum and huge awareness would be created.

The software is going to be of a futuristic nature but easy to operate. It starts by accepting the input off the user (test) and the performing a sequence of instructions on that data that allows the software to determine if the individual is infected or not.

In the case of the corona virus, we have to take extreme precaution. That is why there would be a section for the expression of symptoms and that for the asymptomatic individual which just takes a specimen of the physical nature such as sputum/throat swab. After all the tests is done, the results of the individual is stored as well as his personal details. This serves a great deal to get the real numbers or at least an estimate of the number of people that has the virus in the country.

Specification.

To break down this seemingly complex software, there's a need for specification.

There would be a machine that is available at all the designated check points. The machine hardware would have input ports/devices which it would use to accept specimen as well as a user-interface which it would use to interact with the user via a screen sensitive to touch/ a computer pen.

Before the test for the symptoms, the user would be required to input details regarding his name, date of birth, phone number, address, occupation, and other relatives that have he/she has been recently in contact with.

If this information is successfully stored, he is asked to proceed to the next platform. Otherwise, he is asked to re enter the information provided.

Following this, there would be a display of symptoms being experienced which the user is meant to check. Any symptom he experiences is to be checked. The symptoms include; cough fever, tiredness and breathing difficulty.

If the minimum of the number of symptoms ticked is passed, then it proceeds to the next platform.

Next up is the breathing test. A face mask which has a sensor to enable it is properly worn would be provided to carry out this breathing test (which is to hold breath for up to 10 seconds without any sign of discomfort or irritability).

N/B: **this is done because the virus spreads affects the lungs, damaging most alveoli and therefore making it difficult to breathe. Due to this breath holding becomes uncomfortable.**

If the test is passed, then the testing terminates, meaning individual is not infected but if the test is failed, the individual is required to proceed to the sputum/ throat swab test.

It is here that the hardware of the system comes into great use. It requires a biomedical equipment that checks the specimen imputed for the presence of the virus.

The test involves:

-Detection of one genome targeted by real time PCR.

-If detection is indeterminate, the real time PCR and detection of COVID-19 by sequencing is initiated.

The equipment does the check and displays the result.

This result is displayed to the user and then stored in the data base which can be accessed at the main branch. The data is stored using a database management platform.

The process then terminates.

The **Design** Stage Is Next.

The algorithm which is required is displayed below:

ALGORITHM.

Step 1: start

Step 2: read name, address, phone number, date of birth, relations recently in contact with.

Step 3: print symptoms expected i.e. options of symptoms to be checked by the user which includes cough, fever, tiredness and breathing difficulty.

Step 4: read selected symptoms

Step 5: IF symptoms selected doesn't match that of a COVID-19 patient

Print "COVID-19 test negative"

Result=negative

Store Result in database

End

ELSE

Print “wear face mask provided”.

Step 6: read if mask is worn successfully (via sensors)

Step 7: IF worn properly

Print “successfully worn”

Print “proceeding to start timer”

ELSE

Print wear mask properly

Back to step 7

Step 8: read pressure (via pressure gauge in mask)

Step 9: print “start timer”

Step 10: IF pressure= pressure for 10 seconds clock time (i.e. if pressure is constant)

Print COVID-19 negative

Result=”negative”

Store Result in database

End

ELSE

Print COVID-19 suspected

Step 11: print “input sputum/ throat swab into input section of biomedical device/testing tool kit”

Step 12: Read data (result) from biomedical equipment

Step 13: IF E-gene present

Read degree of infection from biomedical equipment

Print “COVID-19 test positive”

Print degree of infection

Result=”positive”

Print “please go to nearest isolation/rehabilitation center.

ELSE

Print “COVID-19 test negative”

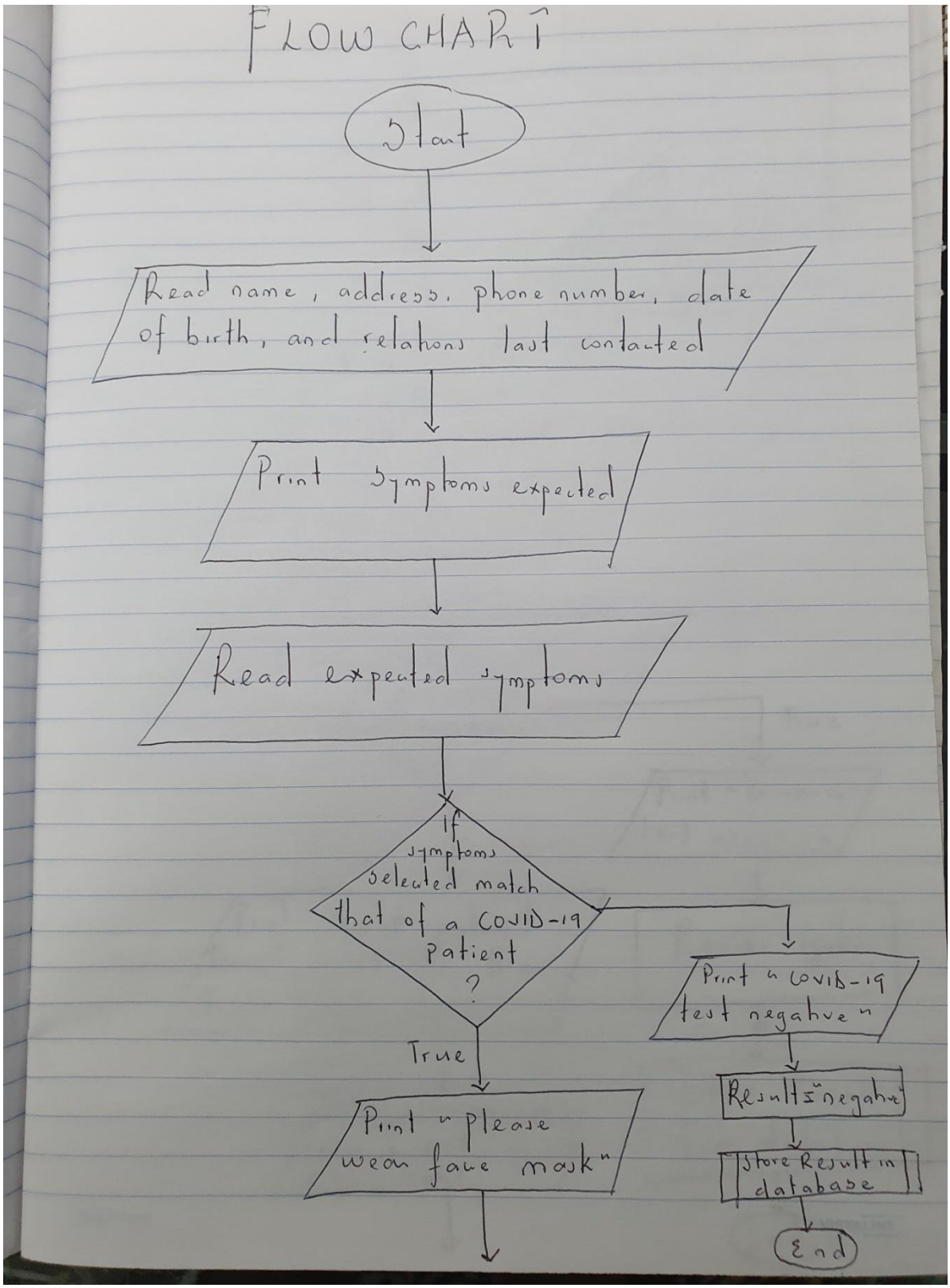
Result=”negative”

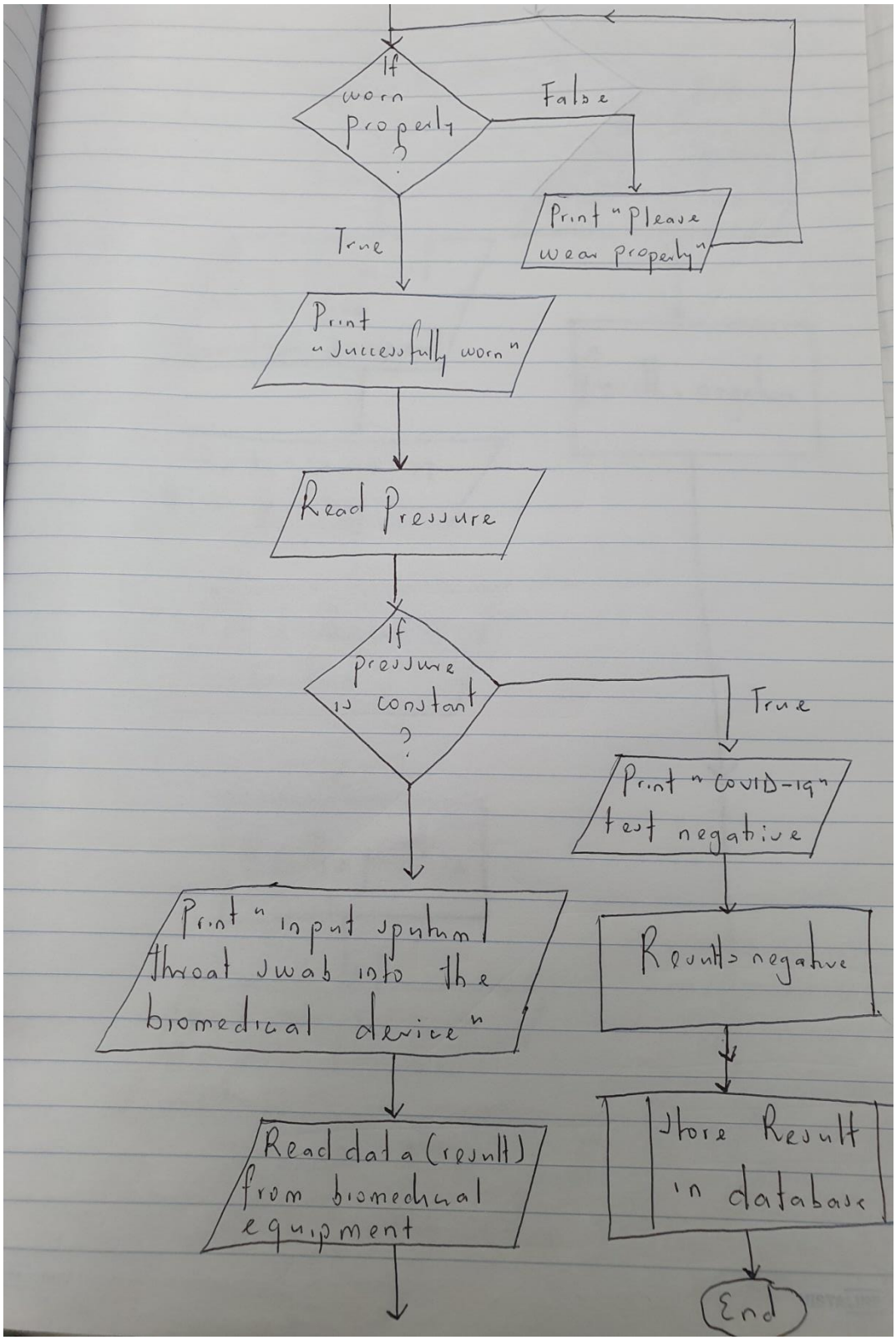
Step 14: store Result in database

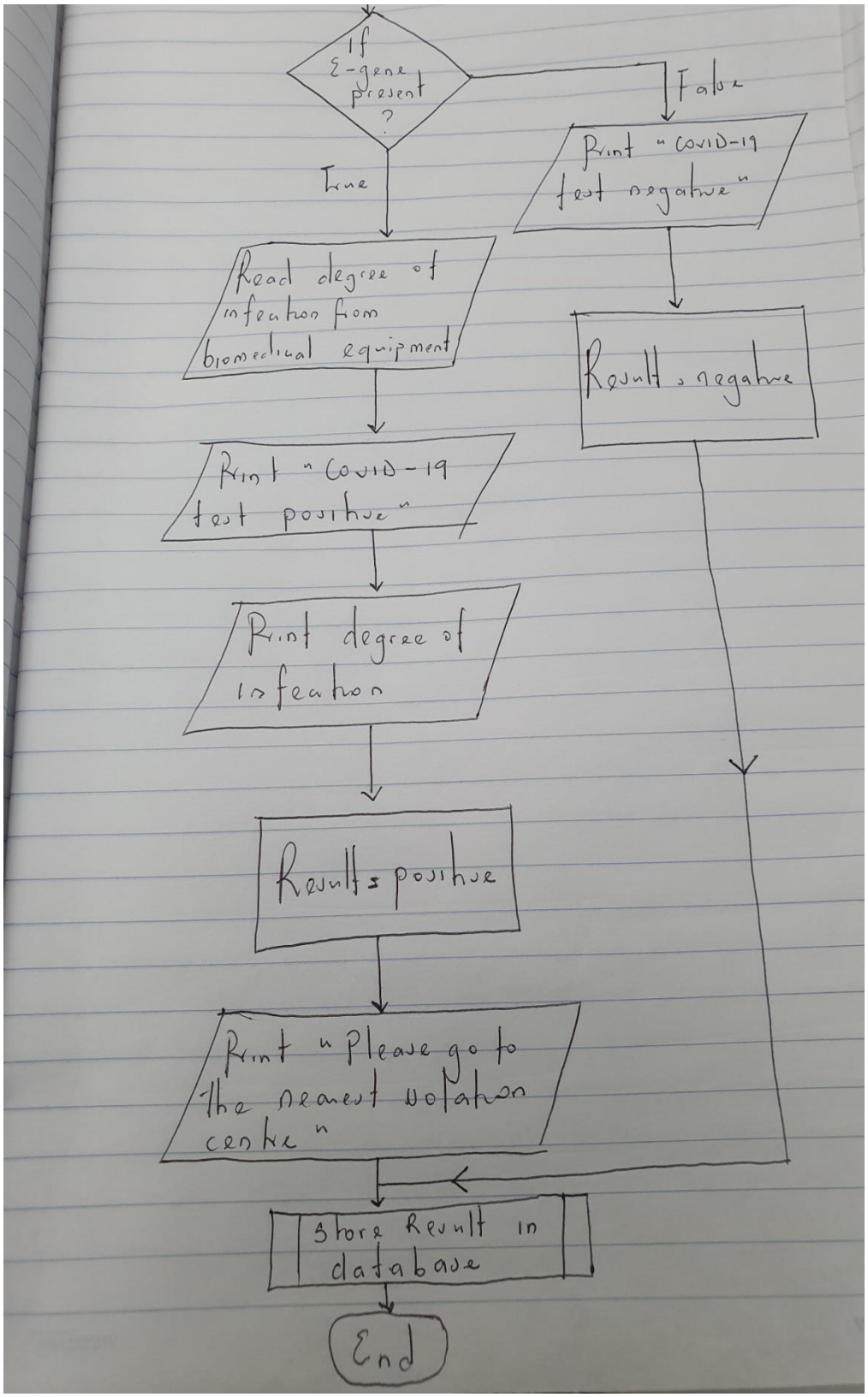
Step 15: End

FLOWCHART.

FLOW CHART


Start
Read name, address, phone number, date of birth, and relations last contacted
Print symptoms expected
Read expected symptoms
if symptoms selected match that of a COVID-19 patient ?
True
Print "please wear face mask"
Print "COVID-19 test negative"
Result="negative"
Store Result in database
End


If worn properly ?
False
Print "Please wear properly"
True
Print "Successfully worn"
Read Pressure
If pressure is constant ?
True
Print "COVID-19" test negative
Print "input sputum/ throat swab into the biomedical device"
Result= negative
Read data (result) from biomedical equipment
Store Result in database
End


If E-gene present ?
False
True
Print "COVID-19 test negative"
Read degree of infection from biomedical equipment
Result = negative
Print "COVID-19 test positive"
Print degree of infection
Result = positive
Print "Please go to the nearest isolation centre"
Store Result in database
End

IMPLEMENTATION.

Web based applications are usually written in HTML, CSS and Java Transcript in order for it to be used on a web browser or access the internet. Java transcript is a high level language that uses curly-braced symbols, dynamic typing, prototype based object orientation and first class functions. It will be used to write this application since it is used as a part of web pages.

With regards to the data base management which would enable the storing, retrieval, editing and access of data, we could either use mysql or oracle. Either would serve as a proper database management application.

TESTING AND DEBUGGING.

To test the written program, various random people are used to input information regarding their symptoms, if any and their locations. Any errors that occur during the testing stage will be removed through debugging.

Before this application is giving out for adequate implementation by the government, the app would be run several times in the office of design and all the errors or potential problems would be solve or corrected. After this is done the application would be taken a little further to the local areas and its use and effectiveness would be checked on the smaller population. Suitable adjustments would also be made during this stage.

Finally, the application is given to the government for final implementation. Various equipment and devices associated with this application would be placed in various access centers of major cities or states. Thos would help boost its effectiveness.

RELEASE AND UPDATE

The app is released to the public and will be accessed through a web browser. Any new discoveries made by doctor or the programmers would be implemented and sent as an update to the web application for users to benefit

It should be noted that the complete design of the web application cannot be done in just one attempt but instead is a continuous process to serve the purpose better. In that updates would be done at regular intervals to serve this cause.

HARDWARE AND SOFTWARE FEATURES.

A quick look into the various aspects of this concept is required because of its ambiguity /complexity. Therefore it is of importance that the hardware is explained separately from the software for most effectiveness.

HARDWARE**.**

The hardware aspect of this whole concept basically revolves around the input and output processes.

There would exist a facial recognition scanner which would use infrared rays to detect the presence of a human body otherwise the system would refuse to begin.

Also sensors would be present in the mask in order to detect when the mask is worn properly which would be read by the software.

A pressure gauge would be embedded into the mask to check if the pressure increases due to coughing or any sort of disturbance that the user might give out to show that there is an infection.

Lastly biomedical equipment/ testing toolkit would be available. This would contain sets of swabs for the throat and also a small glass plate for the collection of sputum. The machine does its work to analyze and attempt to detect the presence of a gene in the samples given E-gene. This indicates the presence of the corona virus. All the data gotten from the machine as well as its processed

conclusions would be called by the main program so the execution of instructions can continue.

Specimen would be tested using the E-gene real time PCR assay, the more sensitive of the two PCR targets.

Incase of E-gene target result which is indeterminate, further investigations would be made. These include the RdRp gene real time PCR assay or sager sequencing for the COVID-19 virus RdRp gene. Detection of COVID-19 virus by either RpRd gene assay or detection of any other single gene target with a validated assay is sufficient for laboratory confirmation.

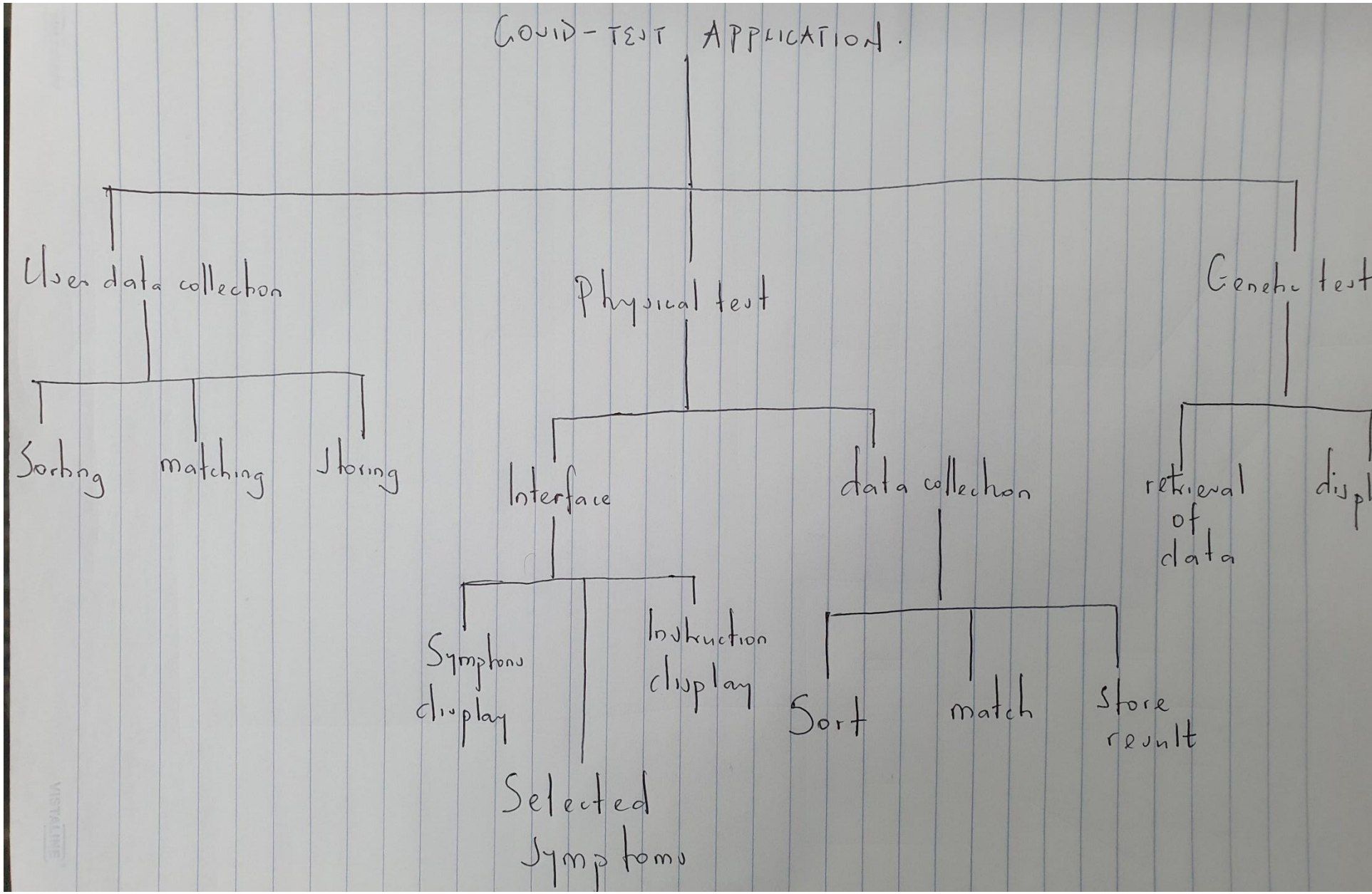
Software

This deals with majorly the proceedings of the test. It also collects the information/ input from the hardware devices and processes it on its own. The software is written in java script for it to be an impeccable web browser.

There would be codes written for each sensor for it to perform its tasks. These codes can be written using the java programming language. Not only these, but also for the pressure gauges that would be installed. This also can be written in java. The hardware components would be programmed with any of the low level languages since they are more machine oriented unlike the higher level which is task oriented. Low level language include assembly language

It should be noted that coded would be required to adequately link up with the data base. This is very important. The database would be either mysql or oracle. General control of the web application can only be accessed from one point with the permission or password access of the admin in charge.

TOP DOWN DESIGN APPROACH OF THE APPLICATION.


COVID-TEST APPLICATION.
User data collection
Physical test
Genetic test
Sorting
matching
Storing
Interface
data collection
retrieval of data
Symptoms display
Instruction display
Selected Symptoms
Sort
match
Store result