**ALGORITHM ASSIGNMENT**

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**QUESTION.**

**Covid-19 has causes a serious pandemic across the world, with serious impacts been felt in all areas of humanities. As a young engineer working with a multi-national health company, you are saddle with a huge responsibility of designing web-based application that can detect, display, rate (degree of infection), store, transmit data obtained wirelessly and access the data via the web together with other features which the board of directors allow you to come up with.**

1. **Design the application following the software development cycle.**
2. **Critically discuss the hardware and software features.**
3. **Support your answer with a flowchart and an algorithm.**
4. **Draw the Top-down or Bottom-up design approach of the application.**

***SOFTWARE DEVELOPMENT PROCESS***

The Software Development Process otherwise known as the Software Development Cycle. They are steps involved in building an application. There are six steps involved in the software development Process of the application ;

CONCEPTUALIZATION

SPECIFICATION

DESIGN

IMPLEMENTATION

TESTING & DEBUGGING

RELEASE & UPDATE

For ***the COVID-19,*** The steps listed above would be followed and explain.

**CONCEPTUALIZATION**

Conceptualization involves having an idea or concept to solve a problem or develop an application to help solve the problem. Since no solution has being developed or found for the COVID-19 pandemic, the web application I would be creating would only be involving the precautions needed, emergency contacts ,facts about the virus, A fill-out form to detect if the user has the virus, degree of infection i.e, the number of infected people , deaths, and survivors of the virus , a platform to speak with professionals. Also, there will be a portion for review from the user.

**SPECIFICATION**

Specification involves the dividing the application into two different Modules, the Software and the Hardware.

Hardware

* Camera
* Stethoscope
* Thermometer
* Pulse Oximeter
* Sphygmaomanometer
* Microphone

Software

* GUI ( Graphical User Interface)
* User Interphase
* User Experience
* Data base Management
* Text- Editors / IDE
* API ( Application Programmable Interphase)
* HTML
* Java script
* CSS

**DESIGN**

Design involves breaking the application into step by step into which the application will flow. Tools used in designing an application i.e algorithm, Flow chart, Top-Bottom design.

For the Web application for COVID-19, the design is as followed; The user opens the application , then a login page displays this is where the user has to login or create an account. After the login page, an home page is displayed where facts about the virus are displayed in one corner as a slideshow, also there is a portion on the home page where the user clicks, to fill a form which is displayed as questionnaire, in the form to fill some questions will asked for the user to answer which will require some medical equipment. If the user does not have such equipment, there’s link provided to download applications that can perform those tasks ,The form will detect if the user has the virus based on the answers given. If the user is negative, the application take the user to a page where precautions are, but if positive, the application will take the user to another page where the user has a choice to either call emergency number based on the user location or call an expert( a link for this will be provided ). Also, after the user must have answered the questionnaire, and other features (like the emergency contacts ) the application will now go to the home page where the rate or degree of the infection is displayed at one corner. Finally, the user will have a portion for reviews on the application. The tools used in designing this applications are algorithm, flow chart, top-bottom diagram.

**IMPLEMENTATION**

Implementation is when the code is written for the application. This is performed by using either a High level language or Low level language.

The development of the web application following the design structure will be addressed into two sections the frontend and the backend. *Front End*

The front end is been coded in three parts using the HTML(Hypertext Markup Language) which is the language of the web and the skeleton of every web application, the CSS(Cascading Style Sheet) which gives the web app its beautiful looks and Java script which helps give the app its functionality and adds interactivity. For the web application to be able to run efficiently on all browsers, the UTF-8 character encoding is been made use of.

*Back End*

The backend will be coded using Node Js. The Js stands for Javascript. Node Js is a Java script library that helps programmers connect their sites to the database or rather servers for data storage. Here Google's Fire Base has been used for Data Storage also the recently developed google map API which is used by google and many healthcare systems to provide real time information and statistics on COVID-19 around the world has been used.

**TESTING & DEBUGGING**

Testing and Debugging, this is checking the performance of the system and checking for errors and removal of errors.

Although at each stage of development the system has been tested, after the front end and the backend of the web application has been developed, they are all integrated together for final testing which can be done manually on the company's system before uploading to the internet. The testing is a critical part of the development processes because it helps detect bugs which are being fixed and helps provide a perfect system for user’s use.

**RELEASE & UPDATE**

The web application is release to the public for use, and there will be an update and development on the application based on the user’s review.

***HARDWARE & SOFTWARE FEATURES***

The Hardware and Software are important parts of this application. The application cannot exist without this two modules. For the Hardware, the following components will be required for the application of the COVID-19. The Camera and Microphone work hand in hand with each other, these components will be required in the aspect of contacting the specialist or expert and also when contacting the emergency. The Stethoscope( used to check heart beat) ,Thermometer( used to check temperature), Pulse Oximeter( used to check pulse) , Sphygmaomanometer( used to check heart pressure) all these are also components that will be needed in the application, they will be specifically in the fill out form aspect. Some of this component listed, may not be available to some of the users, a link will be provided to download some application that can be used in place of the components. The Software module of this application are as follows, GUI ( Graphical User Interface) ,User Interphase,User Experience,Data base Management,Text- Editors / IDE, API ( Application Programmable Interphase), HTML, Java script ,CSS . All these listed above will be used in designing the various pages.

***FLOW CHART & ALGORITHM***

**FLOWCHART**

START

CHART OF RATE OF INFECTION

LOGIN

PINNED MAP OF COUNTRIES RECORED

HOME

EMERGENCY NUMBERS

INFO PAGE ABOUT THE VIRUS

LINK TO DOWNLOAD APPLICATION FOR THE COMPONENTS

CONTACT FOR THE EXPERT

QUESTIONNAIRE

REVIEW ABOUT THE APPLICATION

SECURE DATA

ABOUT US

**ALGORITHM**

10. Start

20. To test for COVID-19

30. Input Login Details

-If Password = true

Display Home Page

-Else

Display Line 30

40. Home Page

Print;

Facts about the virus

Questionnaire

Rate of Infection of the Virus

Review about Application

50. Go to Questionnaire

60. Print Result

-If Result = false

Display= “NEGATIVE”

Then GO to Home Page

-Else

Display= “POSITIVE”

Then

Print “CONTACT EMERGENCY” and “SPEAK TO EXPERT”

Then GO to Home page

70. Save DATA

80. End

***TOP-DOWN DESIGN***

START

HOME

ABOUT THE VIRUS

EMERGENCY NUMBER QUESTIONNAIRE

SYMPTOMS RATE OF INFECTION

SAFETY PRECAUTIONS