

RASPBERRY PI BASED ONLINE EXAMINATION

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ABSTRACT

A Raspberry pi based online examination framework has been proposed. Presently a day's broadly utilized framework for leading examination is online mode. The installed gadget outlined here works in view of RDP convention; this convention is in charge of correspondence between the ace unit and the slave units. This installed gadget can get to the server by Raspberry pi board which is of minimal effort as opposed to utilizing CPU which is of high cost and even can be diminished.

Keywords: *Raspberrypi, 7 inches LCD screen, master computer, Wifi, C++ programming.*

I. INTRODUCTION

Online examination is another method to lead an examination through web. Online examination is an exceptionally advanced examination directing framework. Selection representative just sends a mail to the contender for the post and it will be come to the a huge number of enlist hopefuls. Online examination framework is of ease, least exertion, least representative arrangement, sparing time, moment result and directs an examination wherever required. The goal of this framework is to plan an inserted gadget which effectively gets to a server with minimal effort and low power utilization which should be possible by utilizing Raspberry pi as opposed to utilizing CPU which exists as of now. In this one ace PC control all slave units is finished with the assistance of RDP convention.

In many colleges and training organizations online exams are in tremendous use which is conducted via internet. [1] Stand alone release and online version are the two sorts of examination frameworks. Program/Server, customer/server engineering, auto question generator framework, security and randomization are incorporated into this online examination framework. A succession of zeros and one bits which are come about because of irregular number generators for the uses of cryptography are assembled into squares of arbitrary esteems. So as to give security different verification strategies are utilized. In light of information of the specific client, objects and physical or behavioral elements the primary confirmation is performed. Validation based with protest is not secure as it exchanged to an outsider.

[2]Based on LAN condition of utilization improvement the customer/server structure is outlined. With utilization of web correspondence the program/server structure is not constrained to a specific locale. This framework is reliant on examination administration module. Putting away of inquiries with their choice arrangement, exam data, handling data and breaking down. All required here is a total framework I.e... A PC with a console and mouse with a web association. This framework even uses confirmation framework for greater security. Profile based confirmation, biometric based validation is performed. A PC with web for correspondence design is required.

[3]The online exams are electronic where competitors login to a site and begin composing the exam. At first the inquiries are put away in information base and these inquiries are scattered and are unique in relation to individual to individual which gives preference of not duplicating. Just target kind of question is available in these online examination frameworks. As exam is not just implied for target sort of inquiries even it contains spellbinding answers. Printed answers, graphs are bolstered all the more proficiently by tablet pc. Content can be composed; charts can be drawn by tablet pc, as console or stylus is utilized to enter their answers. Assessment is done consequently if there is basic content however there is the need of human for content assessment, which is perplexing in nature.

[4]Online examination framework is utilized for leading exams notwithstanding for remote competitors. Assessment of various decision questions is totally done suddenly. Contingent upon the idea of inquiries and necessities the assessment of paper sort questions is done physically or consequently. The cost of online exam is around zero when contrasted with manual method of exams. An essential hotspot for college is online examination and the advancement of system innovation strategies has given the likelihood to lead the exams on the web. Going to the security, the current existing strategy for recognizable proof of an understudy is by checking the understudy card, driving permit, occupant card or visa. Security control, verification, trustworthiness of online exam process is bolstered by utilizing biometric is proposed in this paper. This paper focuses on the online exam for fundamental PC in college courses with understudies at specific areas, at a settled time and confused inquiries for all examinees at the confined physical area of examinees.

[5] Online learning has become increasingly popular. Online exam plays an important role in online education. Online education material is easily accessible and widely updatable. Face to face interaction between students and system administrator's is absent in the online examination mode. Thus security has become important issue in this scenario. Students may submit plagiarize work as part of their assessment. So plagiarism can be one of the major challenges to online learning. Cheating seems to be a serious issue in online examination system. In order to overcome the problem raised, there uses a technique called visual cryptography which provides better secure authentication framework for online examination system which is explained in this paper. Visual cryptography is a cryptographic technique which allows visual information to be encrypted in such a way that decryption can be performed by human visual system.

II. PROPOSED SYSTEM

Principle thought to execute this task is to propose and develop a cheap dependable and capable strategy for online examination framework. Proposed framework comprise of a Raspberry pi utilized as minicomputer, 7 inches touch screen LCD for show reason, Wi Fi dongle for correspondence reason between ace PC and slave units. Ace unit control all slave unit and furthermore spare all information and understudy data, for example, understudy subtle elements, login and secret word and results. All the inquiry paper store in the ace unit and after association build up and after begin order given from Master PC the Slave unit will start the Exam. After exam is finished the appropriate response backpedal to the ace unit, its check with standard answer store in it and show on slave unit in the meantime it store in ace unit moreover.

The past all examination frameworks is rely upon program server structure or customer server structure. What's more, examination framework needs an Internet association. A large portion of the online examination framework utilizes a java content dialect and JSP (Java Server Program with a database). The proposed framework here utilizations C++ dialect. Likewise the online examination framework utilized the distinctive confirmation .For recognizable proof of each understudy. The distinguishing proof should be possible with various verification. However, this required PC framework. So plan a framework with just a single ace PC and other is a slave unit. Framework comprises of two units one is an ace unit and second is slave unit. The ace unit comprises of ace PC which is control the all slave units. The slave units comprise of Raspberry Pi 2 module B, 7 inches touch screen LCD, Wi-Fi dongle, HDMI link each square clarify beneath. Following square outline demonstrates two units and equipment utilized as a part of framework.

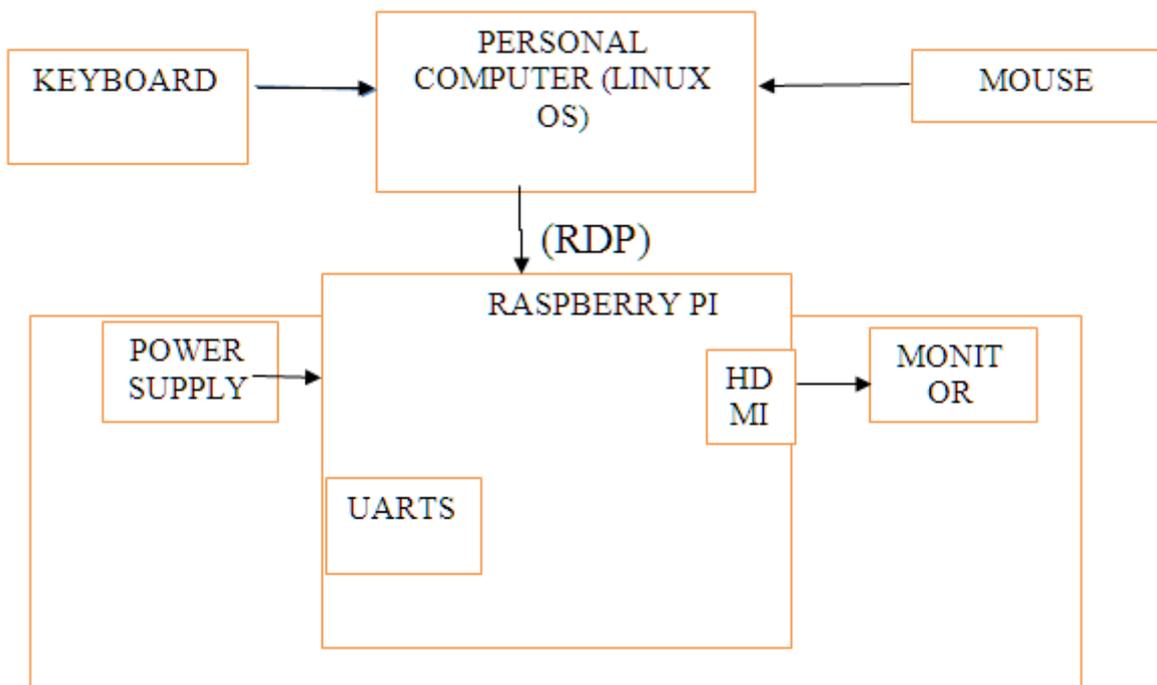


Fig 1: Block Diagram of the System

Ace unit comprises of a Master PC which is associated with Intranet for sending and accepting of the inquiries and answers. It is utilized for sending the information (Question Paper) to Slave Unit and furthermore accepting the last information from the Slave Units. The Slave unit comprises of raspberry pi, and inches LCD screen, Wi-Fi Dongle, HDMI link. Raspberry pi is a low Cost little and convenient size of PC board it has a superior intense processor its primary center dialect is raspbian OS can likewise create content or program utilizing python dialect. Raspberry pi 3 has CPU 700 MHz BCM2835quad-center ARM Cortex-A7 Memory,1GB RAM, It has a 40 stick GPIO connector, small scale SD. Motivation behind utilizing raspberry pi 3 module B is it give 1 GB RAM and it is perfect with Wi-Fi association and 7 inches touch screen LCD. Every one of the information of ace unit is associated with a raspberry pi and afterward show on LCD. The ARM-based BCM2835 is the mystery of how the Raspberry Pi can work on simply the 5V 1A control supply gave by the locally available

small scale USB port. It's likewise the motivation behind why you won't discover any warmth sinks on the gadget: the chip's low power draw straightforwardly converts into almost no waste warmth, notwithstanding amid muddled preparing assignments. The raspberry pi 3 module B running inactive 200mA Current. With Wi-Fi running, that includes another 170mA. On the off chance that you have Ethernet rather, that includes around 40mA. The 7" Capacitive Touch Screen LCD upgrades the UI involvement in any undertaking. It bolsters different frameworks, for example, Raspberry Pi, Banana Pi, Banana Pro, Beagle Bone Black and so forth. The implicit HDMI (High Definition Multimedia Interface) interface empowers the show to fill in as PC screen simply like some other HDMI screen. It has 800 × 480 high resolutions; Supports Raspberry Pi accompanies Raspbian driver. LCD screen give backdrop illumination change used to turn on and off backdrop illumination. Current attracted LCD is 600mA total. You can diminish that down 400mA by running the backdrop illumination at half shine. Backdrop illumination off the decoder and show itself draws 250mA current. Interface the LCD to the HDMI on the Raspberry Pi board with a HDMI link for showing control. Associate the USB Touch interface on the LCD to the USB interface on the Raspberry Pi board with a USB sort A male to miniaturized scale B link. The HDMI utilizes TMDS (Transition Minimized Differential Signaling) to move data starting with one place then onto the next. Wi-Fi Dongle is associated with pi. Wi-Fi is utilized to build up remote association between ace unit and slave unit. The scope of Wi-Fi is 50 to 100 meters. Working Frequency of Wi-Fi is 2.4GHz. Despite the fact that the Wi-Fi information can be send from ace unit to slave unit and back to ace unit moreover.

2.1 Software

2.1.1 REMOTE DESKTOP PROTOCOL:

Remote desktop convention (RDP) is a protected system correspondences convention intended for remote administration, and also for remote access to virtual desktops, applications and a RDP terminal server. RDP permits arrange chairmen to remotely judgments and resolve issues singular supporters encounter. RDP is accessible for most forms of the windows working system. RDP is an open source UNIX customer for associating with windows remote desktop administrations, proficiently of locally RDP keeping in mind the end goal to display the client's windows desktop. RDP is known to work with windows server adaptation going from NT 4 terminal server to windows 2012 R2. RDP as of now keeps running on most UNIX based stages with the X window framework, and different ports ought to be genuinely straight forward. RDP is discharged under the GNU open permit, form 3. The most recent stable rendition of RDP is right now v.1.8.3. The RDP convention itself is basically an augmentation of the ITU-T T.128 application sharing convention. Microsoft has as of late made RDP details straightforwardly accessible by means of the MSDN library. A consistent RDP server augmentation is accessible to help joining of individual applications with the customer desktop. The objective of this task is to give a completely utilitarian Linux terminal server, equipped for tolerating associations from remote desktop, free rdp and Microsoft's own particular terminal server/remote desktop customers. Unlike windows NT/2000/2003/2008/2012 server, xrdp won't show a windows desktop yet a X window desktop to the client.

2.1.2 Features and Functions

Critical properties of RDP incorporate encryption, shrewd card confirmation, data transmission decrease and asset sharing, the capacity to utilize numerous showcases and the capacity to separate briefly without logging offered likewise takes into consideration the redirection of capacities, for example, sound and printing. RDP can bolster up to 64,000 autonomous channels for information transmission. Information can be scrambled utilizing 128-piece keys, and the transmission capacity decrease include advances the information move rate in low speed associations.

2.1.3 Working

The RDP convention is intended to give remote access through port 3389. An RDP-empowered application or administration bundle the information that will be transmitted, and the Microsoft interchanges benefit guides the information to a RDP channel. From that point, the working framework encodes the RDP information and adds it to an edge with the goal that it can be transmitted. The terminal server gadget redirector driver handles all RDP convention movement. This driver is comprised of subcomponents, for example, the RDP driver, which handles UIs, exchanges, encryption, pressure and confining. The vehicle driver is in charge of bundling the convention such that enables it to be sent over a TCP/IP arrange.

2.1.4 Security

some security issues before, however. Early forms contained a weakness The convention has displayed that permitted a RDP session to succumb to a man-in-the-center assault, through which the assailant could increase unapproved get to. More up to date forms of RDP are significantly more secure. Windows working frameworks contain an instrument for indicating which clients are permitted to get to the framework through a RDP session. There is likewise a choice to keep anybody from remotely getting to the framework unless they are utilizing system – level validation. It is by and large prescribed that manager's and end client's just utilize RDP when it is completely vital, and that they run it with the most minimal level of advantage conceivable.

2.2 Operating System

LINUX: Linux or GNU/Linux is a free and open source programming working framework for PCs. The working framework is a gathering of the essential guidelines that tell the electronic parts of the PC what to do and how to function. Free and open source programming (FOSS) implies that everybody has the flexibility to utilize it, perceive how it works, and changes it. There is a considerable measure of programming for Linux, and since Linux is free programming it implies that none of the product will put any permit confinements on clients. This is one reason why many individuals get a kick out of the chance to utilize Linux. A Linux-based framework is a particular Unix-like working framework. It infers quite a bit of its essential plan from standards set up in UNIX amid the 1980s. Such a framework utilizes a solid portion, the Linux part, which handles process control, systems administration, and fringe and document framework get to. Gadget drivers are either incorporated straightforwardly with the piece or included as modules stacked while the framework is running. UI projects, for example, order shells or windowing situations

2.3 Hardware

2.3.1 Regulated Power Supply

A variable directed power supply, additionally called a variable seat control supply, is one where you can persistently modify the yield voltage to your prerequisites. Shifting the yield of the power supply is the prescribed approach to test an undertaking in the wake of having twofold checked parts position against circuit illustrations and the parts situation direct. For the most part the ARM controller needs 3.3 volt control supply. To utilize these parts we have to construct a managed 3.3 volt source. Typically you begin with an unregulated energy to influence a 3.3 volt to control supply; we utilize a LM317 voltage controller IC (Integrated Circuit).

HDMI:

Tyco Electronics' connector consolidating High-Definition Multimedia Interface (HDMI™) innovation is an interface for shopper gadgets items, Such as advanced TV, set-top boxes and DVD players.HDMI bolsters standard, improved, or top notch video, in addition to multi-station sound on a solitary link.

2.3.2 Raspberry Pi Board

The Raspberry Pi is a charge card measured PC that attachments into your TV and a console. It is a fit little PC which can be utilized as a part of hardware ventures, and for a large number of the things that your desktop PC does, similar to spreadsheets, word-handling and recreations. It likewise plays top quality video. The Raspberry Pi 3 has a Broadcom BCM2835 framework on a chip (SoC), which incorporates an ARM1176JZF-S 700 MHz perfect focal preparing unit(CPU) that speed ranges from 700 MHz to 1.2Ghz 64-bit quad center ARM cortex-A53 processor with 512 kb of store, Video Core IV GPU, and was initially delivered with 256 megabytes of RAM, later updated (Model 3) to 1GB. It does exclude an inherent hard plate or strong state drive, yet it utilizes a SD card for booting and steady stockpiling. Display 3 is the higher-spec variation of the Raspberry Pi, with 1 GB of RAM, four USB ports, 3.5mm telephone jack for sound and a 100mb Ethernet port. It's our most famous model: you can utilize it to find out about processing; to control genuine ventures (like home bottling works, arcade machines, melodic root vegetables, robot tanks and considerably more); as a web server; a bit coin digger; or you can simply utilize it to play Mine specialty. The sort 3 pi board contains 26 GPIO pins and each has particular capacity. The sort pi 3 has on board Wi-Fi 802.11n and Bluetooth.

2.3.3 BCM2835 highlights

A Raspberry Pi board contains BCM2835 controller which bolsters ARM11 handling unit which underpins following elements.

BCM2835 contains the accompanying peripherals which may securely be gotten to by the ARM:

- supports 700MHZ preparing unit recurrence
- Timers
- Interrupt controller
- GPIO

- USB
- PCM/I2S
- DMA controller
- I2C ace
- I2C/SPI slave
- SPI0, SPI1, SPI2
- PWM
- UART0, UART1

The accompanying are fundamental to begin:

- SD card containing Linux Operating framework.
- USB console
- TV or screen (with HDMI, DVI, Composite or SCART input)
- Power supply (see Section 1.6 underneath)
- Video link to suit the TV or screen utilized

Working System in SD Card:

- As the RPi has no inward mass stockpiling or inherent working framework it requires a SD card preloaded with a variant of the Linux Operating System.
- You can make your own particular preloaded card utilizing any reasonable SD card (4GBytes or above) you need to hand. Utilize another clear card to maintain a strategic distance from contentions over lost pictures.

2.3.4 Console and Mouse:

Most standard USB consoles and mice will work with the RPi. Remote console/mice ought to likewise work, and just require a solitary USB port for a RF dongle.

2.3.5 Show:

HD TVs and numerous LCD screens can be associated utilizing a full-measure "male" HDMI link, and with an economical connector if DVI is utilized. HDMI variants 1.3 and 1.4 are upheld and form 1.4 links are suggested. The RPi yields sound and video through HMDI, yet does not bolster HDMI input.

2.3.6 Power Supply:

A standard present day telephone charger with a small scale USB connector will do, giving it can supply no less than 700mA at +5Vdc.

2.3.7 Links:

You will require at least one links to associate up your RPi framework.

- HDMI-A link + DVI connector
- Composite video link + SCART connector
- Audio link (not required in the event that you utilize the HDMI video association with a TV)
- Ethernet/LAN link

2.3.8 Web Connectivity:

- This might be by means of an Ethernet/LAN link (standard RJ45 connector) or a USB Wi-Fi connector.
- The Rpi Model B Ethernet port is auto-detecting which implies that it might be associated with a switch or specifically to another PC (without the requirement for a hybrid link).

III. RESULTS AND DISCUSSIONS

In this system, for an online examination we are using a Raspberry pi board which acts as a CPU for complete processing of the examination. By using raspberry pi board which is of low cost can access the server within the LAN. The old techniques such as conducting online examination using internet is eliminated by using Wi-Fi, router, such that the communication between the server and client is increased to maximum distance of 32 meters within the room. Coming to the security the old methods such as verifying the person used to be done by thumb impression, Aadhar card number, any other ID proofs. But with the help of biometric we can make the exam more secure.



Fig 2: Board Connections

IV. IMPLEMENTATION RESULTS

After the power supply given to the slave unit the raspberry pi and LCD screen initialized. After start command given from Master computer the Slave unit will start the Exam. The Question paper sends to the master unit. Which question paper come from master unit to slave unit is depend on administrator. The administrator assigns the question paper set that question paper shown on slave unit after the login and password of user are correct. After login, the exam starts and the timer is also start. After time, up or after final submission the slave unit sends the result to master unit. Master unit will start analyzing the answers with the standard format stored in it. After completion, the Master unit will display the result within some time on slave unit and also store the result in master unit.

Figure 3 show the Log In screens if user already registered. If new user wants to register for exam, it selects registration window that is Sign up. After the login and password is correct the next screen display on LCD which is shown below.

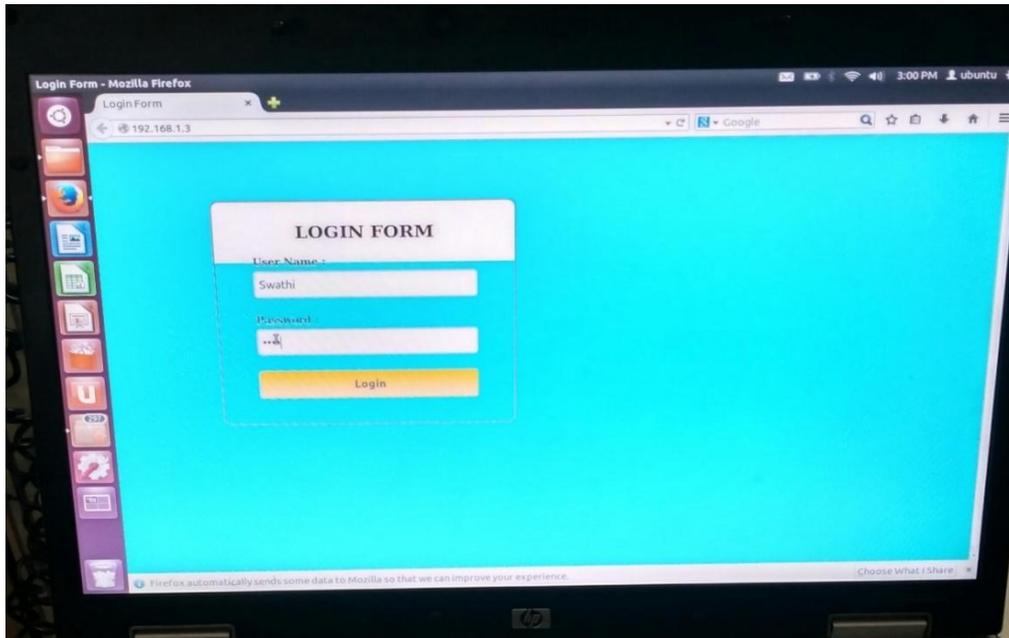


FIG 3: Login Window

After the sign in the next window is dashboard and in that there is a Test, Test History and Logout option is available. Test window shows the Test name, Total test mark, Duration of test, and start option. Click on this button and exam start.

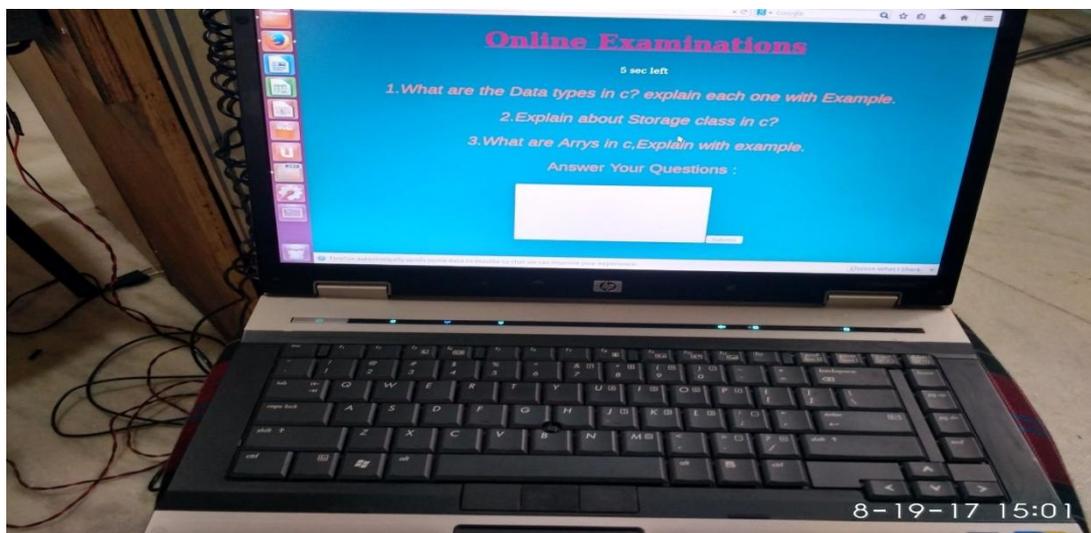


FIG 4: QUESTION PAPER DISPLAY

Question paper window shown above in Figure 4. In this actual question display on screen and after submit the current question or if click on next button next question can be display. Right hand side of the screen the number of question in this paper is display.

Online Exam

Your Test Submitted Successfully

Test Name	Total Question	Total Time	Total Marks	Required Marks	Total Marks (Obtained)
Option a	2	1 min	2	1	1

[Back to Home](#)

FIG 5: RESULT WINDOW

Result window show like Figure 5 after the exam completed. This window shows that a test name, total question, total time for exam, total mark, required mark for passing and last is obtained mark for particular candidate.

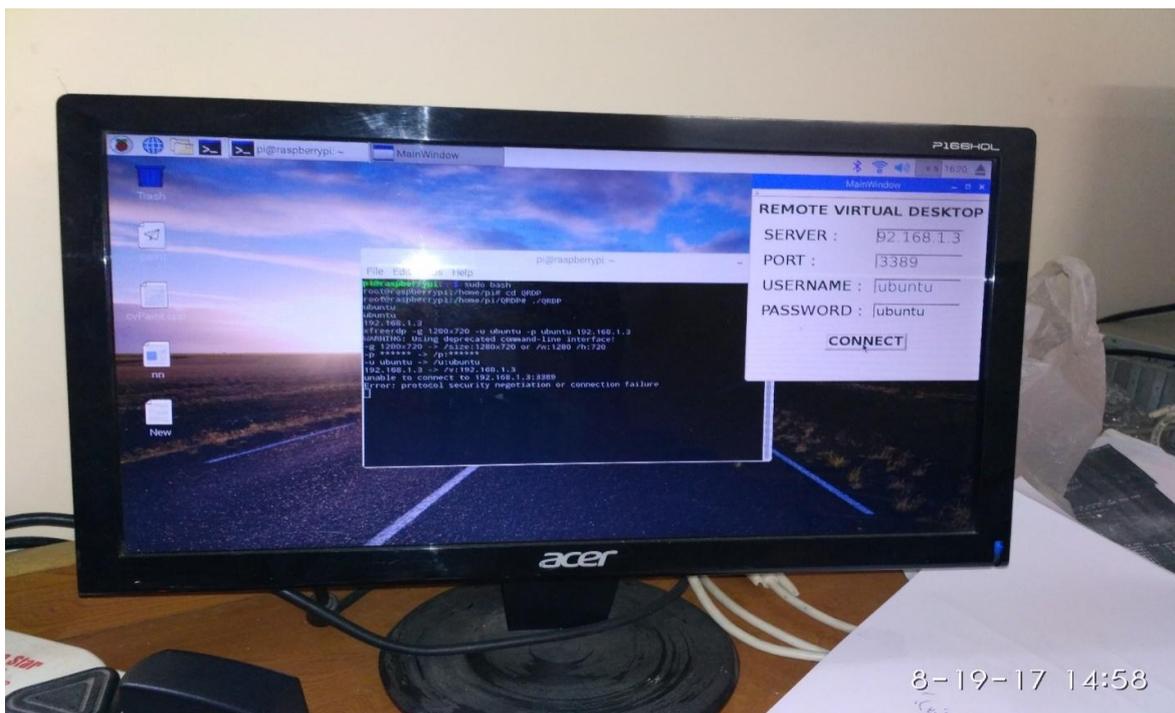


FIG 6: WINDOW ON CLIENT SYSTEM

Once the board is switched on, the terminal on client system should be open by pressing ctrl+alt+t. After this by giving two commands a window like above is displayed. After entering server number, user name and password once all the options are matched the server can be accessed. Once the server is accessed the question paper will be displayed and the individual can start his or her exam. Once the time is finished the exam paper gets submitted directly and the login window is displayed.

V. CONCLUSION

Online Examination System provides more effective and efficient examination environment with low cost and small size device. Each Slave unit communicate with master computer and after the exam finished the result can be display on slave unit and store in master computer. Using this we able to reduce the requirement of computers and hence the cost is reduced. This is very useful in school, Institute, and companies for examination purpose.

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