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Digital Class Room

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Abstract: Often a Computer is very much expensive and has enormous electric power requirement. The recent introduction of the Raspberry Pi, a low-cost, low-power single-board computer, has made the construction of a miniature Computers more affordable. The Digital Class Room based on Raspberry pi will be a single-board Computer Which Gives a Visual Interface for the Class Room. Router will Act as Intermediate Middleman which connects the Other Devices to the Raspberry Pi. This application deals with the Android App to project the Screen to the Raspberry Pi

Keywords— Raspberry Pi, Router,Computers,Class Room

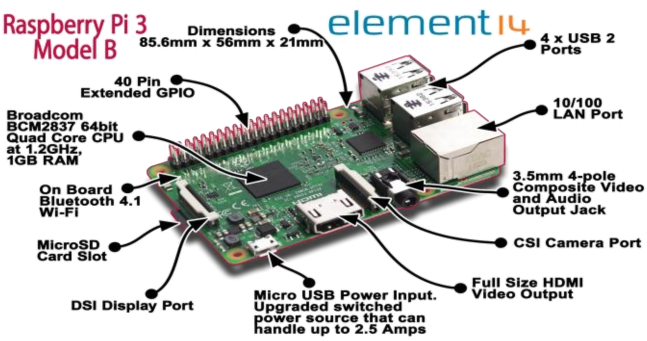
I. INTRODUCTION

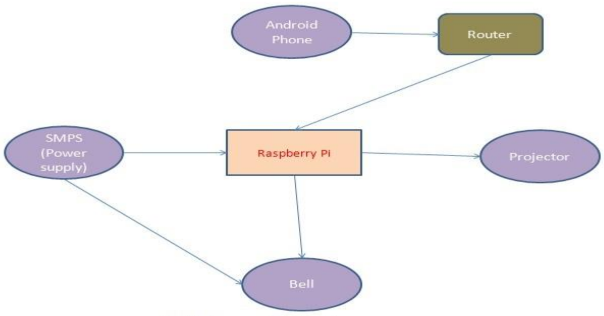
In this System we are using the Linux as OS(operating System), all Software are Supported in it.We are using Android APP to Control the System Through Android via Wi-Fi. One Server is Created in Raspberry Pi where all Data is Present, we can access the data via LAN Cable/FTP.One bell system is present in it rings the bell as soon the lecture is over.

Raspberry Pi will be a low-end affordable server which expects low traffic and will enable a cheap alternative to small management as well as record keeping applications which are usually required to run 24x7 and occupies a costly server which is never optimally used by it. Affordable server offer hardware and software based customized solution, giving complete flexibility to the clients to customize RAM, hard drive, processor, and application version as per their requirements

II. HARDWARE

A. Raspberry Pi





Block Diagram of Digital Classroom

B. PROCESSOR

The Broadcom BCM2835 SoC used in the first generation Raspberry Pi is somewhat equivalent to the chip used in first generation smartphones (its CPU is an older ARMv6 architecture), which includes a 700 MHz ARM11 76JZF-S processor, Video Core IV graphics processing unit (GPU), and RAM. It has a level 1 (L1) cache of 16 KB and a level 2 (L2) cache of 128 KB. The level 2 cache is used primarily by the GPU. The SoC is stacked underneath the RAM chip, so only its edge is visible. The Raspberry Pi 2 uses a Broadcom BCM2836 SoC with a 900 MHz 32-bit quad-core ARM Cortex-A7 processor (as do many current smartphones), with 256 KB shared L2 cache.

The Raspberry Pi 3 uses a Broadcom BCM2837 SoC with a 1.2 GHz 64-bit quad-core ARM Cortex-A53 processor, with 512 KB shared L2 cache.

C. OVERCLOCKING

The CPU chips of the first and second generation Raspberry Pi board did not require cooling, such as a heat sink, unless the chip was overclocked, but the Raspberry Pi 2 SoC may heat more than usual under overclocking.

Most Raspberry Pi chips could be overclocked to 800 MHz, and some to 1000 MHz .There are reports the Raspberry Pi 2 can be similarly overclocked, in extreme cases, even to 1500 MHz (discarding all safety features and over-voltage limitations). In the Raspbian Linux distro the overclocking options on boot can be done by a software command running "sudo raspi-config" without voiding the warranty. In those cases the Pi automatically shuts the overclocking down if the chip reaches 85 °C (185 °F), but it is possible to override automatic over-voltage and overclocking settings (voiding the warranty); an appropriately sized heat sink is needed to protect the chip from serious overheating.

Newer versions of the firmware contain the option to choose between five overclock ("turbo") presets that when used, attempt to maximize the performance of the SoC without impairing the lifetime of the board. This is done by monitoring the core temperature of the chip, the CPU load, and dynamically adjusting clock speeds and the core voltage. When the demand is low on the CPU or it is running too hot the performance is throttled, but if the CPU has much to do and the chip's temperature is acceptable, performance is temporarily increased with clock speeds of up to 1 GHz depending on the individual board and on which of the turbo settings is used.

The seven overclock presets are:

- none; 700 MHz ARM, 250 MHz core, 400 MHz SDRAM, 0 over volt,
- modest; 800 MHz ARM, 250 MHz core, 400 MHz SDRAM, 0 over volt,
- medium; 900 MHz ARM, 250 MHz core, 450 MHz SDRAM, 2 over volt,
- high; 950 MHz ARM, 250 MHz core, 450 MHz SDRAM, 6 over volt,
- turbo; 1000 MHz ARM, 500 MHz core, 600 MHz SDRAM, 6 over volt,
- Pi2; 1000 MHz ARM, 500 MHz core, 500 MHz SDRAM, 2 over volt,
- Pi3; 1100 MHz ARM, 550 MHz core, 500 MHz SDRAM, 6 over volt. In system information CPU speed will appear as 1200 MHz When in idle speed lowers to 600 MHz

In the highest (*turbo*) preset the SDRAM clock was originally 500 MHz, but this was later changed to 600 MHz because 500 MHz sometimes causes SD card corruption. Simultaneously in *high* mode the core clock speed was lowered from 450 to 250 MHz, and in *medium* mode from 333 to 250 MHz .The Raspberry Pi Zero runs at 1 GHz. A modification suggested on 4HV.org is to replace the crystal with an external clock generator, then start off at stock speed for initial boot-up. It appears that at some combinations of clock speed and temperature the chip becomes meta-stable and its memory exhibits quantum effects that can be used for annealing simulations however a lot more work is needed to make this useful. It should be noted that this breaks HDMI output due to nonstandard clock speeds so another way to read back data would be needed such as a frame buffer running off the existing composite video output.

D.RAM

On the older beta Model B boards, 128 MB was allocated by default to the GPU, leaving 128 MB for the CPU. On the first 256 MB release Model B (and Model A), three different splits were possible. The default split was 192 MB (RAM for CPU), which should be sufficient for standalone 1080p video decoding, or for simple 3D, but probably not for both together. 224 MB was for Linux only, with only a 1080p frame buffer, and was likely to fail for any video or 3D. 128 MB was for heavy 3D, possibly also with video decoding (e.g. XBMC). Comparatively the Nokia 701 uses 128 MB for the

Broadcom Video Core IV. For the new Model B with 512 MB RAM initially there were new standard memory split files released(arm256_start.elf, arm384_start.elf, arm496_start.elf) for 256 MB, 384 MB and 496 MB CPU RAM (and 256 MB, 128 MB and 16 MB video RAM). But a week or so later the RPF released a new version of start.elf that could read a new entry in config.txt (gpu_mem=xx) and could dynamically assign an amount of RAM (from 16 to 256 MB in 8 MB steps) to the GPU, so the older method of memory splits became obsolete, and a single start.elf worked the same for 256 and 512 MB Raspberry Pi. The Raspberry Pi 2 and the Raspberry Pi 3 have 1 GB of RAM .The Raspberry Pi Zero has 512 MB of RAM.

D. NETWORKING

The Model A, A+ and Pi Zero have no Ethernet circuitry and are commonly connected to a network using an external user-supplied USB Ethernet or Wi-Fi adapter. On the Model B and B+ the Ethernet port is provided by a built-in USB Ethernet adapter using the SMSC LAN9514 chip. The Raspberry Pi 3 is equipped with 2.4 GHz Wi-Fi 802.11n (150 Mbit/s) and Bluetooth 4.1 (24 Mbit/s) based on Broadcom BCM43438 chip and a 10/100 Ethernet port.

E. REAL TIME CLOCK

The Raspberry Pi does not come with a real time clock, which means it cannot keep track of the time of day while it is not running. As alternatives, a program running on the Pi can get the time from a network time server or user input at boot time. A real-time clock (such as the DS1307) with battery backup can be added via the IC interface

F. RELAY

A simple electromagnetic relay consists of a coil of wire wrapped around a soft iron core, an iron yoke which provides a low reluctance path for magnetic flux, a movable iron armature, and one or more sets of contacts (there are two contacts in the relay pictured). The armature is hinged to the yoke and mechanically linked to one or more sets of moving contacts. The armature is held in place by a spring so that when the relay is de-energized there is an air gap in the magnetic circuit. In this condition, one of the two sets of contacts in the relay pictured is closed, and the other set is open. Other relays may have more or fewer sets of contacts depending on their function.

G. ROUTER

A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet. A data packet is typically forwarded from one router to another router through the networks that constitute the internetwork until it reaches its destination node.

A router is connected to two or more data lines from different networks. When a data packet comes in on one of the lines, the router reads the address information in the packet to determine the ultimate destination. Then, using information in its routing table or routing policy, it directs the packet to the next network on its journey. This creates an overlay internetwork.

The most familiar type of routers are home and small office routers that simply pass IP packets between the home computers and the Internet. An example of a router would be the owner's cable or DSL router, which connects to the Internet through an Internet service provider (ISP). More sophisticated routers, such as enterprise routers, connect large business or ISP networks up to the powerful core routers that forward data at high speed along the optical fiber lines of the Internet backbone. Though routers are typically dedicated hardware devices, software-based routers also exist.

III. SOFTWARE

A. RASPBIAN

Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make your Raspberry Pi run. However, Raspbian provides more than a pure OS: it comes with over 35,000 packages pre-compiled software bundled in a nice format for easy installation on your Raspberry Pi. The initial build of over 35,000 Raspbian packages, optimized for best performance on the Raspberry Pi, was completed in June of 2012. However, Raspbian is still under active development with an emphasis on improving the stability and performance of as many Debian packages as possible. The Raspbian Server Edition is a stripped version with other software packages bundled as compared to the usual desktop computer oriented Raspbian. PiBang Linux is derived from Raspbian. A Raspbian image is a file that you can download onto an SD card which in turn can be used to boot your Raspberry Pi and Via APC into the Raspbian operating system. Using a Raspbian image is the easiest way for a new user to get started with Raspbian.

B. ANDROID STUDIO

Android Studio is the official integrated development environment (IDE) for the Android plat form. It was announced on May 16, 2013 at the Google I/O conference. Android Studio is freely available under the Apache License 2.0.Android Studio was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014. The first stable build was released in December 2014, starting from version 1.0 Based on JetBrains IntelliJ IDEA software, Android Studio is designed specifically for Android development. It is available for download on Windows, mac OS and Linux, and replaced Eclipse Android Development

Tools (ADT) as Google's primary IDE for native Android application development.

C. TIGHTVNC

TightVNC uses so-called "tight encoding" of areas, which improves performance over low bandwidth connection. It is effectively a combination of the JPEG and zlib compression mechanisms. It is possible to watch videos and play DirectX games through TightVNC over a broadband connection, albeit at a low frame rate. TightVNC includes many other common features of VNC derivatives, such as file transfer capability.

IV. WORKING

User will have to connect to the Wi-Fi System. We have created an Android Application .Application will create a server which records the live session and send to the Networks at particular port Android application takes the IP and Port Values Automatically .Now we have to type the IP address of server. In any browser so we can connect to the Android Scree. The Displaying Of Screen Depends on Transmission Medium and the Quality of the Data Which is Send .Python code is controlling the GPIO pin which controls the bell system .We have created different Tasks for Different Lectures So After each Lecture one task get performed and Bell Rang.

V. CONCLUSION

The Paper has carried on the raspberry Pi Based Digital Class and the Android Application Which are connected to the same Network and Transmit the Android Screen to the Browser. These System Deal with the Wireless Network for Connectivity.

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