ANALYSIS OF METHODS OF USING THE RASPBERRY PI PLATFORM IN THE TRAINING OF COMPUTER ENGINEERS

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Raspberry Pi is the name of a series of single-board computers and high-performance microcontrollers. First of them was launched by the Raspberry Pi Foundation in 2012. A UK charity that aims to teach people in computing and provide them with easy knowledge in the Internet of Things, giving a big opportunity to use their products. Also it is cheap and costs less than 35 $ and there is a model that costs only 5$.

The methodology of training specialists in the field of computer engineering is based on a number of principles based on the proposals of employers, graduates and students themselves. These principles are regulated by state standards in the field of higher education and organically combine the requirements of industry and basic training of higher education [1].

The purpose of this work is to analyze the methods of using one of the most popular platforms Raspberry Pi (RPi) in the training of specialists in the field of computer engineering. The RPi platform has a large number of release lines that have a common concept, but different power, design or component base [2-3].

An RPi is a single-board mini-computer that runs on a unified operating system (OS). The most used is Linux. This is due to the fact that it requires 35 MB of RAM. The use of other operating systems may require other technical characteristics of the boards.

The first RPi run requires the Linux kernel to be installed on the device's RAM. A flash drive is used for this purpose. There are many Linux distributions that are designed for different tasks, but usually use Raspbian Jessie or Ubuntu distributions. They are based on the Debian distribution and have a high level of reliability. It should be noted that some modifications of the RPi platform can work with Windows 10 IoT Core. This increases the popularity of the platform in the training of computer engineers.

The use of mini-computers in the educational process is explained by the fact that the use of microcontrollers and debug boards has a number of limitations in the application of practical knowledge. Unlike the Arduino, RPi supports peripherals via USB, HDMI, RCA Jack, Ethernet and built-in Wi-Fi and Bluetooth modules. The RPi also has at least 40 GPIO pins for connecting sensors, expansion modules, and more. The use of single-board computers has gained

popularity due to a strong community of experts who support the updating of the technical literature on project development on RPi .

Let us analyze the main methods of using the RPi platform:

- use of the platform in information communications. The platform allows you to install a virtual PBX Asteriks. The essence of the projects is that you need to build a GSM gateway based on a mini-computer, connecting a 3G/4G modem and configuring the Asteriks channel driver. On request, you can install the graphical interface FreeBPX or RasBPX;

- use of the platform in the media space. Because the platform has the ability to connect to the Internet, it can often be used to manage network hard drives with SSH access. In particular, RPi supports Consumer Electronics Control technology. Thus, to control peripherals that are connected via the HDMI port, you can only use the remote control when viewing media content, etc.;

- use the platform as a control mini-computer for a smart home. Based on a satisfactory level of computing power, the platform can integrate a large number of controllers connected to the RS-485 bus to service multiple devices. The technical features are that the RS-485 bus connects to the web server, which is organized on RPi, via the RS-485/UART converter. The web interface of the system allows you to control all devices and receive information from them about their status in real time. And due to the network interface, you can organize remote control of the system via a 3G/4G modem.

These are not all areas where a mini-computer can be used, but the above is enough to conclude that RPi provides many opportunities in the training of computer engineers.

Thus, by organically combining the principles of using RPi with other platforms, it is possible to create methodological principles of software and hardware training in computer engineering. The new knowledge will also increase the level of knowledge when working with specific operating systems based on the interaction of computers, peripherals and microcontrollers.

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