Raspberry Pi Summer Camp at IPFW

Guoping Wang

Indiana University Purdue University Fort Wayne
Department of Electrical and Computer Engineering IEEE Fort Wayne Section

wang@ipfw.edu

June 25, 2017
# Table of Contents

1. **Camp Overview**
   - Introduction
   - Camp Instructors
   - Camp website
   - Camp Schedule
   - Camp Materials
   - Camp Assessments
   - Camp Exercises

2. **IEEE**

3. **Raspberry Pi**

4. **Python**
Table of Contents

1 Camp Overview
   • Introduction
   • Camp Instructors
   • Camp website
   • Camp Schedule
   • Camp Materials
   • Camp Assessments
   • Camp Exercises

2 IEEE

3 Raspberry Pi

4 Python
Camp Overview

- Sponsors: IEEE Fort Wayne Section and Region 4 Educational Activities Fund (Camp T-shirt and snacks/drink/food)
- Sponsors: IPFW, College of ETCS, Department of Electrical and Computer Engineering
- This Raspberry Pi Camp is targeted on rising 7-9th grade students.
- Hosted by IPFW College of Engineering, Technology, and Computer Science and IEEE Fort Wayne Section.
Camp Instructors

Instructor
Dr. Guoping Wang
Associate Professor of Computer Engineering at IPFW.
email: wang@ipfw.edu, Telephone: (260)481-6036
IEEE Fort Wayne Section Chair

Assistant
Christopher Wang
10th Grade Homestead High School Student
Experienced in Raspberry Pi, Arduino, Python, Javascript, C programming
Familiar with computer building, troubleshooting
Camp Website

- **Summer Camp website at ieeefortwayne**
- All related references, camp materials (forms, flyers, schedules, slides) can be founded over there.
- Most updated camp-related information.
- Some camp slides are compiled using materials available on the website with acknowledgment to named or anonymous authors.
## Camp Schedule (tentative)

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday, June 26</th>
<th>Tuesday, June 27</th>
<th>Wednesday, June 28</th>
<th>Thursday, June 29</th>
<th>Friday, June 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30-10:00am</td>
<td>Welcome Survey, Introduction to Python</td>
<td>Introduction to Python II</td>
<td>Introduction to Python III</td>
<td>Introduction to Raspberry Pi I/O, Linux</td>
<td>Work on team project and Post-camp survey</td>
</tr>
<tr>
<td>10-10:15am</td>
<td>Snack Break, bring drinks</td>
<td>Snack Break, bring drinks</td>
<td>Snack Break, bring drinks</td>
<td>Snack Break, bring drinks</td>
<td>Snack Break, bring drinks</td>
</tr>
<tr>
<td>10:15-10:45am</td>
<td>ECE major talk</td>
<td>Robotic Talk (tentative)</td>
<td>IoT Tech Talk</td>
<td>Raspberry Pi Game Time</td>
<td>Competition</td>
</tr>
<tr>
<td>10:45-12:30pm</td>
<td>Teams become familiar with Raspberry Pi Kit, Learn Python</td>
<td>Continue Python Programming</td>
<td>Python programming</td>
<td>Python and I/O Programming, Team pickup one project to work on</td>
<td>Project Demo, Post-camp Evaluations, Pizza Lunch, Certificate</td>
</tr>
</tbody>
</table>
Camp Materials

1. Ebook: Raspberry Pi Educational Manual, link is available on camp website → Resources
2. Book: Programming the Raspberry Pi — Getting Started with Python
3. Python slides: Camp website → Documents
Camp Evaluation

- Post-camp evaluation, online submission on Friday
- Valuable for future camp improvement.
Raspberry Pi Exercises

- Raspberry Pi exercises (Python, Python with IO control) are assigned and encouraged to finish in two-camper teams.
- For final presentations and demo, please choose one problem or game by yourself.
# Table of Contents

1. **Camp Overview**
   - Introduction
   - Camp Instructors
   - Camp website
   - Camp Schedule
   - Camp Materials
   - Camp Assessments
   - Camp Exercises

2. **IEEE**

3. **Raspberry Pi**

4. **Python**
IEEE

- Institute of Electrical and Electronic Engineers [http://www.ieee.org](http://www.ieee.org)
- Headquartered in New York City.
- The world's largest technical professional society, with a worldwide membership of more than 400,000 electrical, electronics, computer engineers and computer scientists in approximately 160 countries.
- IEEE mission: IEEE’s core purpose is to foster technological innovation and excellence for the benefit of humanity.
- IEEE and its members inspire a global community through IEEE’s highly cited publications, conferences, technology standards, and professional and educational activities.

IEEE Fort Wayne Section
Background & History

- 1884: The American Institute of Electrical Engineers (AIEE) is founded.
- Radio, a new electrical technology, arose in the first decade of the twentieth century.
- Formation of the IRE, 1912.
- On January 1, 1963, the IEEE was born with 150,000 members, 140,000 of whom were in the United States.
IEEE Consists of

- More than 400,000 members in more than 160 countries
- 333 sections in 10 geographic regions worldwide
  Ex: Fort Wayne Section, Central Indiana Section
- Nearly 2,173 branches (chapters) in 80 countries
  Ex: student branch at IPFW, Indiana Tech, Trine University
- 38 societies and 7 technical councils representing the wide range of technical interests
  Ex: IEEE education society, IEEE computer society and IEEE biometric council
- 404 affinity groups (non-technical sub-units of one or more Sections or a Council)
  Ex: Woman in Engineering
- A board of directors which is comprised of the 3 IEEE presidents, the vice presidents and presidents of the 6 major boards, the 10 region directors, the 10 division directors, and the directors emeritus
# Table of Contents

1. Camp Overview
   - Introduction
   - Camp Instructors
   - Camp website
   - Camp Schedule
   - Camp Materials
   - Camp Assessments
   - Camp Exercises

2. IEEE

3. Raspberry Pi

4. Python
Raspberry Pi B Picture
Raspberry Pi B+ I

- Credit card-sized single-board very powerful computer
- On board includes an ARM1176JZF-S 700 MHz processor, VideoCore IV GPU, 1GB RAM
- SD Card for booting with Debian (variation of Linux) and storage.
- Can be easily connected to keyboard, LCD, and internet.
Raspberry Pi B+ II

- Despite its diminutive device, Raspberry Pi is powerful enough to process many of the same programs as PCs, from word processors to games.
- Its small size also makes Raspberry Pi ideal for programming connected home devices—like the print server, which has given us the power to make every computer, laptop, and cell phone in our network printer-compatible.
- Some other projects that can be programmed using Raspberry Pi are personal multimedia server, Wi-Fi enabled home surveillance system, etc.
- There are millions of online resources of Raspberry Pi. You can watch Raspberry Pi Channel on youtube or you can google hundreds of Raspberry Pi resources (videos, ebooks, projects, etc).
Raspberry Pi B+ Connection

Plug in a USB WiFi adapter into one USB port for Internet connection.
Raspberry Pi Configuration

- After Raspberry Pi is booting, and the configuration screen comes up.
  - Option 3 ('Enable Boot to Desktop’) and configure to boot to desktop.
  - Option 4 ('Internationalisation Options:’):
    - Change the locale to use en_US.UTF-8
    - Change the keyboard to use en_US.UTF-8 (enter past all the other keyboard options)
- Tab over to 'Finish’ and reboot.

If your Raspberry Pi is booting into 'Console' mode, type ‘startx’ and Raspberry Pi will enter Desktop mode.
In the Debian console pi@raspberrypi, type `sudo raspi-config` will bring you into Raspberry Pi configuration screen.
Raspberry Pi WiFi Configuration

- Menu → Preferences → WiFi Configuration
- Manage Networks → Enabled (checked) → Scan
- Choose raspberrypi → WPA-Personal, Encryptions: TKIP, → Shared Key: DF13ABTK
- The 2017 Camp will use wired internet connection.
Table of Contents

1 Camp Overview
   • Introduction
   • Camp Instructors
   • Camp website
   • Camp Schedule
   • Camp Materials
   • Camp Assessments
   • Camp Exercises

2 IEEE

3 Raspberry Pi

4 Python