Digital skills and capacity building

Internet Society
Armenia Chapter

IOT lecture course oriented on Arduino controllers

(Chapterthon 2018)

The initiative of Internet Society pronouncing Internet of Things (IoT) as the main idea of the Chapterthon 2018 responded to the needs of the world Internet community. The advent of IoT in all spheres of human life made the training of young people in IoT a matter of urgent necessity.

Because of that the ISOC Armenia Chapter came forward with a project "IOT lecture course oriented on Arduino controllers". The lecture course was aimed to train several specialists and at the same time develop a well tested lecture course that will be used for mass training. The project will benefit the community by development of a lecture course oriented on the widely known Arduino controllers that will be used for training a big number of IoT specialists.

We suppose that the project will give a start to more ambitious project of training a big number of IoT technicians ready to make their inclusion to the development of a digital economy in Armenia. We expect a sponsorship of the future project from the Armenian Internet Registry. The future IoT training courses will be advertised on a specially created Facebook page.

The community attention to the IoT was also attracted on the 4th national IGF that took place in October 10, 2018, by the presentation of Avetik Yessayan "Urban Ecology Monitoring System using IoT". The admittance to the course was advertised by ISOC Armenia Chapter and ISOC AM NGO networks and the following participants were recruited:

Armen Avetyan, Armen Mkhoyan, Armine Martirosyan, Ashot Mkhoyan, David Misakyan, Hakob Krpoyan, Harutyun Vanyan, Hasmik Artemyan, Hegine Shahinyan, Hovsep Minasyan, Hripsime Stepanyan, Lilia Totolyan, Lilit Gevorgyan, Naira Hovhannisyan, Narek Boshyan, Narine Mesropyan, Suren Gevorgyan, Suren Manukyan, Tehmine Grigoryan, Tigran Nikoghosyan, Tigran Unanyan, Vardanush Hovhannisian.

ISOC Armenia Chapter has quite a strong cohort of IoT specialists among its members, including:

-Vahan Misakyan having a good experience in the field developing IoT solutions of several technology applications;

-Karen Yerznkanyan, President of the "Smart City" NGO, fulfilling an IoT project for the Yerevan city municipality;

-Avetik Yessayan, lecturer at the Yerevan State University, reading the IoT course there. He is also heading the Shirak Technologies company, making IoT projects by contracts with house managers from France.

It was decided to organize the lecture course with three levels each enlightening different aspects of IoT applications: Beginners, Intermediate and Advanced. Descriptions of levels are shown below.

The series of lectures were opened by the President of ISOC Armenia Chapter, Igor Mkrtumyan. He presented the mission of the Internet Society and main idea of Chapterthons, the Internet Society is organizing each year, and explained why this year Chapterthon is devoted to the Internet of Things.

1-st level: Beginners

1-st level lectures was conducted by Vahan Misakyan.

His lectures included the following topics:

1. Basics of Arduino controllers' programming in Windows platform
2. Types of Arduino controllers, their specifics and differences
3. Digital input-output
4. Analog input-output
5. Arduino controllers' memory
6. Using Arduino controllers' interrruption system
7. Direct control of outputs with the help of microcontroller registers
8. Ready for use code libraries, their development and utilization
9. Sensors, their structure and utilization by Arduino controllers

The lab works with Arduino controllers using sensors are listed
below: Passive buzzer module, 2 color LED module, Vibration switch module, Photoresistor module, Key Module, Tilt switch module, Infrared sensor module, Active Buzzer Module,
Temperature sensor module, Auto flashing LED light, Colorful LED module, Mini Magnetic Reed Modules, Magnetic Hall Sensor Module Infrared sensor receiver module Class Bihor magnetic sensor, Detectable heartbeat module, Reed module, Obstacle prevention sensor module.

Microphone Sound Sensor Module, Laser sensor module, Relay module, 5 V Temperature sensor module, Flame sensor module, Sensitive microphone sensor module, Temperature and humidity sensor module, XY-axis joystick module, Metal sensor module

The first part of the course was organized at the Internet availability center for blind and visually impaired people created by the earlier ISOC grant thus solving the problem of renting the space and computers. It also demonstrates the continuity of the ISOC projects.

2nd level: Intermediate

2nd level lectures was conducted by Karen Yerznkanyan. His lectures included the following topics:

- IOT solutions in everyday life, industry, agriculture, logistics, environmental protection.
- Technical implementation of IOT. The choice of communication technology for IOT solutions. MQTT protocol. Devices and sensors for IOT.
- Open Source and cloud IOT solutions. Thingsboard, Bluemix IBM, Microsoft Azure.
- Securing IOT solutions

- Lab works

1. Arduino board, Arduino IDE development environment. Connection of sensors and actuators to Arduino. 4 hrs.
2. Modules ESP8266 and Lora. Connection of the ESP8266 module to a WiFi network. Installation of MQTT server. Electronic lock working on MQTT. Control of electricity via the Internet.
3. Building a LoraWAN network. Energy-saving IOT solutions.
4. Connection to Thingsboard and Bluemix servers. Monitoring of air pollution. Monitoring the fullness of garbage containers.

3rd level: Advanced

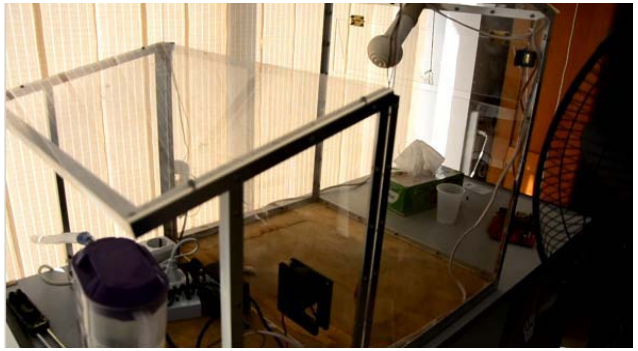
3rd level lectures was conducted by Avetik Yessayan. His lectures included the following topics:

1.IOT for Building Management

- IOT introduction
- IOT system elements and development spheres
- Building Automation needs
- Facility Management with IOT system
- Improve the comfort and quality

2.IOT components for development

- IOT Reference Model
- IOT data driven development
- Sensor technology and standardizations
- Communication technology and standardization
- Cloud Solution



1.Data flow and data control

- IOT Data flow
- IOT data control
- DB as key source for data manipulation
- Time closure and synchronization
- Data correlation
- Data analytics

2.IPv6, IOT security and data privacy

- IPv6 for IOT
- IOT game changer and information security in IOT cluster
- Data ownership
- Privacy

A special lecture devoted to the IoT security and privacy awareness was included in the lecture course. The lab works included:
Development of a model of trash control and removal, defining sensors necessary for that and collecting a prototype of a model.


4 STAGES OF IOT ARCHITECTURE


SAP


ATTACK

Internet Society

Chapters Training 2020

SHAPING THE INTERNET

SECURING GLOBAL ROUTING (MANRS)

BUILDING COMMUNITY NETWORKS

OPEN STANDARTS EVERYWHERE

ENCRYPTION

** only chapter members can apply

Internet Society
Armenia Chapter

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ISOC Armenia Chapter participants had successfully finished the training programs and got their graduation certificates.

Participants

The Internet Society has announced a 2020 Chapter training program, for which the Armenia Chapter selected the coordinator and participants. The Chapter Board Chair Lianna Galstyan was assigned as the Training Program Coordinator and 5 Chapter members were selected to be trainees for the following courses:

- Shaping the Internet - Katarina Gevorgyan, Syuzan Marukhyan.
- Encryption - Katarina Gevorgyan.

- Securing Global Routing - Valeri Stepanyan.
- Open Standards Everywhere - Igor Mkrtumyan.
- Building Community Networks - Ashot Nalbandyan.

Work done by partcipants

- Shaping the Internet- Susan Marukhyan translated "Internet governance policy brief" into Armenian.
- Katarina Gevorgyan made a Research on web accessibility importance and implementation of good practices in Armenia.

•Securing Global Routing (MANRS)- Valeri Stepanyan organized an online webinar on MANRS.
- Valeri Stepanyan prepared a presentation on MANRS.

•Building Community Networks- Ashot Nalbandyan prepared a presentation on "Building Community Networks"

Open Standards Everywhere- Igor Mkrtumyan - in the result of the training was able to increase the compliance of the chronicle.isocchapter.am website from 32 to 55%. It was done by setting the IPv6 addressing at the ISP. The security of the website was increased by setting the secure SSL purchased from a proven provider. DNSSEC was not setup yet because of ISP problems.
HTTP/2 is not working yet because the Apache installed at the hosting company is older that version 2.4.26, required for HTTP/2. However it was planned to upgrade it soon.
- A report on "Open Standards Everywhere" training was done on "Regithon" - a meeting of ISOC Chapter members and network operators on June 11, 2020.

•Encryption- Katarina Gevorgyan translated a presentation on the topic of Encryption.

Internet Society Fundamentals program 2021

Internet Society

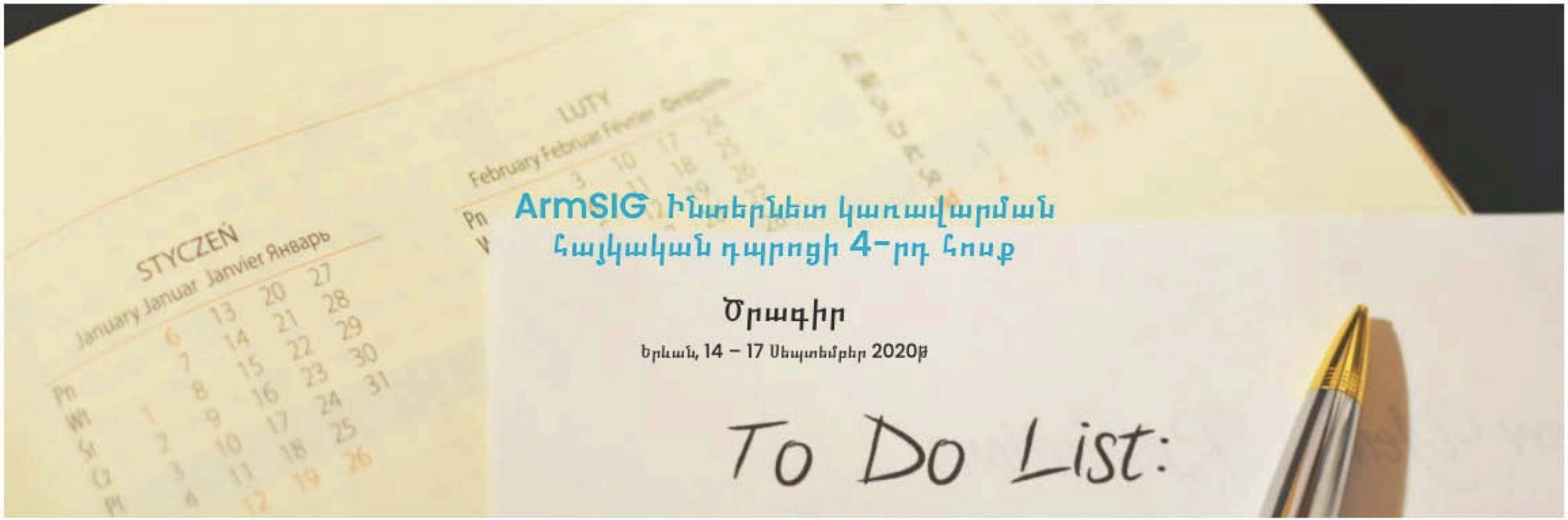
11 ISOC AM members participated in the ISOC Fundamental Program in the following directions

Community Networks,
Encryption,
Infrastructure and Community Development,
Internet Way of Networking,
Open Standards for Web Servers,
Securing Global Routing MANRS

and got certifications

Armenian School on Internet Governance

ARMSIG
ARMENIAN SCHOOL ON INTERNET GOVERNANCE



ArmSIG 5 (Armenian School on Internet Governance)