# **Python Automation with Alexa**

**Abstract:**

Automation is the technology by which a process or procedure is performed with minimal human assistance.Automation or automatic control is the use of various [controlsystems](https://en.wikipedia.org/wiki/Control_system) for operating equipment such as machinery, processes in factories, boilers and heat treating ovens, switching on telephone networks, steering and stabilization of ships, aircraft and other applications and vehicles with minimal or reduced human intervention.Automation covers applications ranging from a household [thermostat](https://en.wikipedia.org/wiki/Thermostat) controlling a boiler, to a large industrial control system with tens of thousands of input measurements and output control signals. In control complexity, it can range from simple on-off control to multi-variable high-level algorithms.In the simplest type of an automatic [control loop](https://en.wikipedia.org/wiki/Control_loop), a controller compares a measured value of a process with a desired set value, and processes the resulting error signal to change some input to the process, in such a way that the process stays at its set point despite disturbances. This closed-loop control is an application of negative feedback to a system. The mathematical basis of [control theory](https://en.wikipedia.org/wiki/Control_theory) was begun in the 18th century and advanced rapidly in the 20th.Automation has been achieved by various means including mechanical, [hydraulic](https://en.wikipedia.org/wiki/Hydraulics), [pneumatic](https://en.wikipedia.org/wiki/Pneumatics), electrical, electronic devices and [computers](https://en.wikipedia.org/wiki/Computer), usually in combination. Complicated systems, such as modern factories, [airplanes](https://en.wikipedia.org/wiki/Airplane) and [ships](https://en.wikipedia.org/wiki/Ship) typically use all these combined techniques. The benefit of automation includes labor savings, savings in [electricitycosts](https://en.wikipedia.org/wiki/Electricity), savings in material costs, and improvements to quality, accuracy, and precis

**Disadvantages:**

* Possible security threats/vulnerability due to increased relative susceptibility for committing errors.
* Unpredictable or excessive development costs.
* High initial cost.
* Displaces workers due to job replacement.

**Advantages:**

* Increased throughput or productivity.
* Improved quality or increased predictability of quality.
* Improved robustness (consistency), of processes or product.
* Increased consistency of output.
* Reduced direct human labor costs and expenses.
* Installation in operations reduces cycle time.
* Can complete tasks where a high degree of accuracy is required.
* Replaces human operators in tasks that involve hard physical or monotonous work (e.g., using one forklift with a single driver instead of a team of multiple workers to lift a heavy object)
* Reduces some occupational injuries (e.g., fewer strained backs from lifting heavy objects)
* Replaces humans in tasks done in dangerous environments (i.e. fire, space, volcanoes, nuclear facilities, underwater, etc.)
* Performs tasks that are beyond human capabilities of size, weight, speed, endurance, etc.
* Reduces operation time and work handling time significantly.
* Frees up workers to take on other roles.
* Provides higher level jobs in the development, deployment, maintenance and running of the automated processes.

**Modules:**

**Python Language:**

High-level programming language, and its core design philosophy is all about code readability and a syntax which allows programmers to express concepts in a few lines of code.

**Python Libraries:** Requests, Json, Flask, Jsonfy.

**Alexa Skill:**

Alexa skill is like an app. You can enable or disable the skill using the Alexa app. Once a skill is enabled, you can launch the skill and do stuff which the skill is capable of performing.

**AWS lambda:**

AWS Lambda is an event-driven, serverless compute service that lets you run code without provisioning or managing servers and can extend other AWS services with custom logic. Lambda can be automatically triggered in response to multiple events, such as HTTP requests through Amazon API Gateway, changes to data in Amazon S3 buckets or an Amazon DynamoDB table, or invoke your code using API calls made using AWS SDKs and state transitions in AWS Step Functions.

**Flask:**

Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. However, Flask supports extensions that can add application features as if they were implemented in Flask itself. Extensions exist for object-relational mappers, form validation, upload handling, various open authentication technologies and several common framework related tools. Extensions are updated far more frequently than the core Flask program.

**Firebase:**

Firebase is a powerful platform for your mobile and web application. Firebase can power your app’s backend, including data storage, user authentication, static hosting, and more. With Firebase, you can easily build mobile and web apps that scale from one user to one million.

**System Requirements**

**H/W System Configuration: -**

|  |  |
| --- | --- |
| * Alexa | * Alexa enabled Echo devices or Android or iOS |

**S/W System Configuration: -**

|  |  |
| --- | --- |
| * Operating System | * Android, Linux, Windows, |
| * Front End | * Alexa |
| * Hosting Server | * AWS lambda |
| * Back End | * Python, |
| * Server Framework | * Flask |
| * Database | * Cloud Firestore by Firebase |
| * Language | * Python 3.6 (little bit old <3) |
| * Scripting Language | * Json |

|  |  |
| --- | --- |
|  |  |
|  | **Presented by**  K.S. Neelofer-163G1A0558  K.S. Nowreen-163G1A0559  A. Bhanu Prakash-163G1A0505  A. Kumar-163G1A0521  M. Ranjith-163G1A0548 |