

CAPSTONE PROJECT

IMPROVED SOURCE OF DRINKING WATER

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OUTLINE

- **Problem Statement** (Should not include solution)
- **Proposed System/Solution**
- **System Development Approach** (Technology Used)
- **Algorithm & Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

PROBLEM STATEMENT

- Access to safe and improved sources of drinking water remains a critical issue in India, especially in rural and underdeveloped regions. Despite ongoing efforts under the Sustainable Development Goals (SDGs), inequalities persist in water accessibility across states and socio-economic groups. This project aims to analyze data from the 78th Round of the Multiple Indicator Survey (MIS) to assess the percentage of the population with access to improved drinking water sources. It will also explore related indicators such as use of clean cooking fuel and migration trends. By identifying patterns and disparities, the study will generate actionable insights to support evidence-based policymaking. The ultimate goal is to help ensure equitable access to clean water and contribute to India's progress on SDG targets.

PROPOSED SOLUTION

1. Analyze MIS 78th round dataset to assess access to improved drinking water sources.
2. Focus on rural vs. urban disparities and inter-state comparisons.
3. Integrate indicators like clean cooking fuel usage and migration patterns.
4. Use data visualization to identify water accessibility gaps
5. Enable predictive modeling for regions lacking improved water access.
6. Generate actionable insights to support evidence-based policymaking.
7. Contribute to SDG 6 (Clean Water & Sanitation) tracking and assessment
8. Develop a cloud-based dashboard to display real-time analytical outputs.

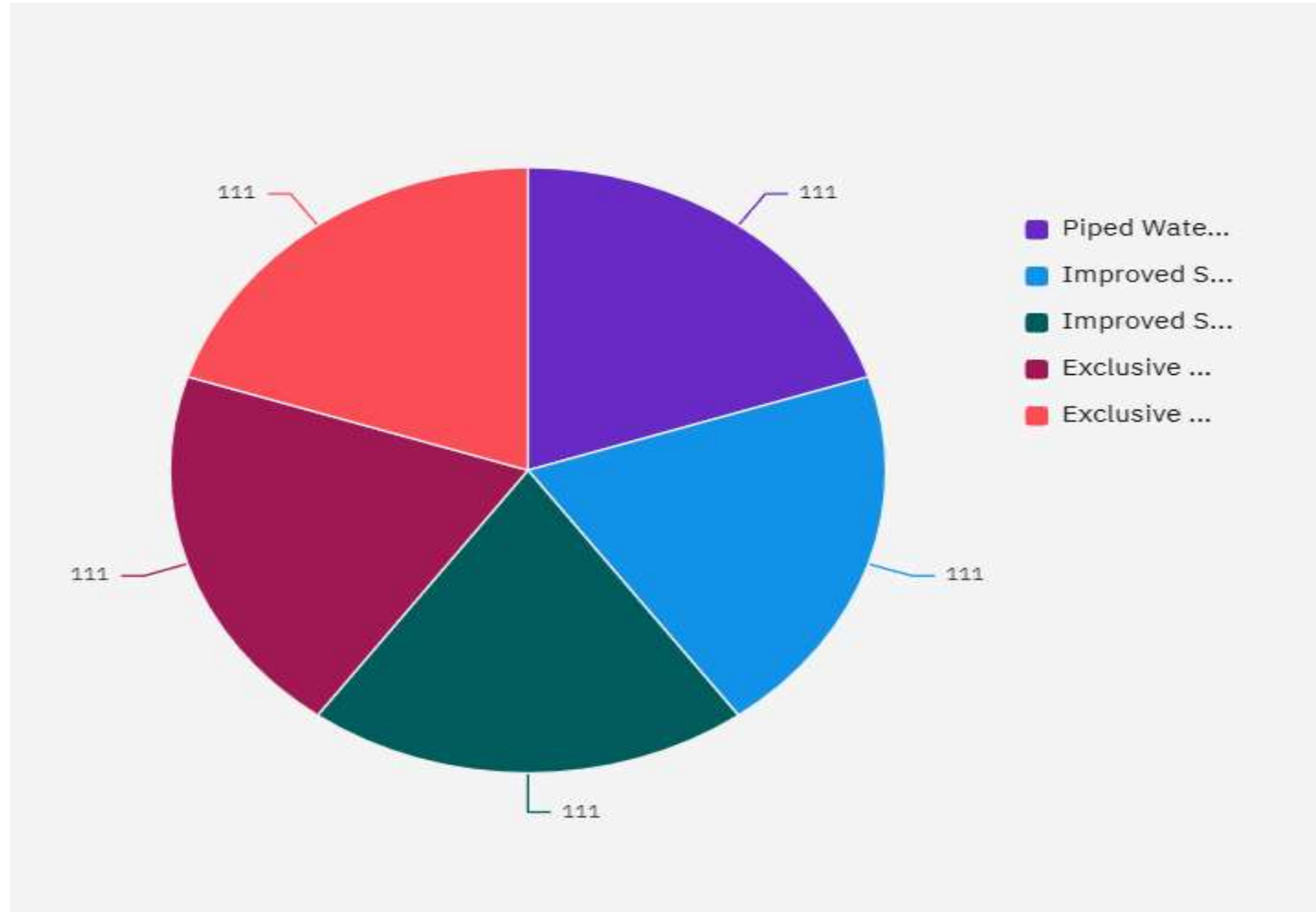
SYSTEM APPROACH

1. Dataset: Used AI Kosh dataset from 78th Round MIS Survey.
2. Platform: Deployed on IBM Cloud Lite using its free-tier resources.
3. Tools: IBM Watson Studio for data analysis and visualization.
4. Languages: Python (pandas, seaborn, matplotlib) for data processing.
5. Deployment: Used IBM Cloud Object Storage and IBM Cloud Foundry.
6. Notebook Environment: Jupyter notebooks in IBM Watson Studio.
7. Data Preprocessing: Cleaning, missing value handling, and encoding.
8. Visualization Tools: IBM Watson Dashboard & matplotlib-based charts.

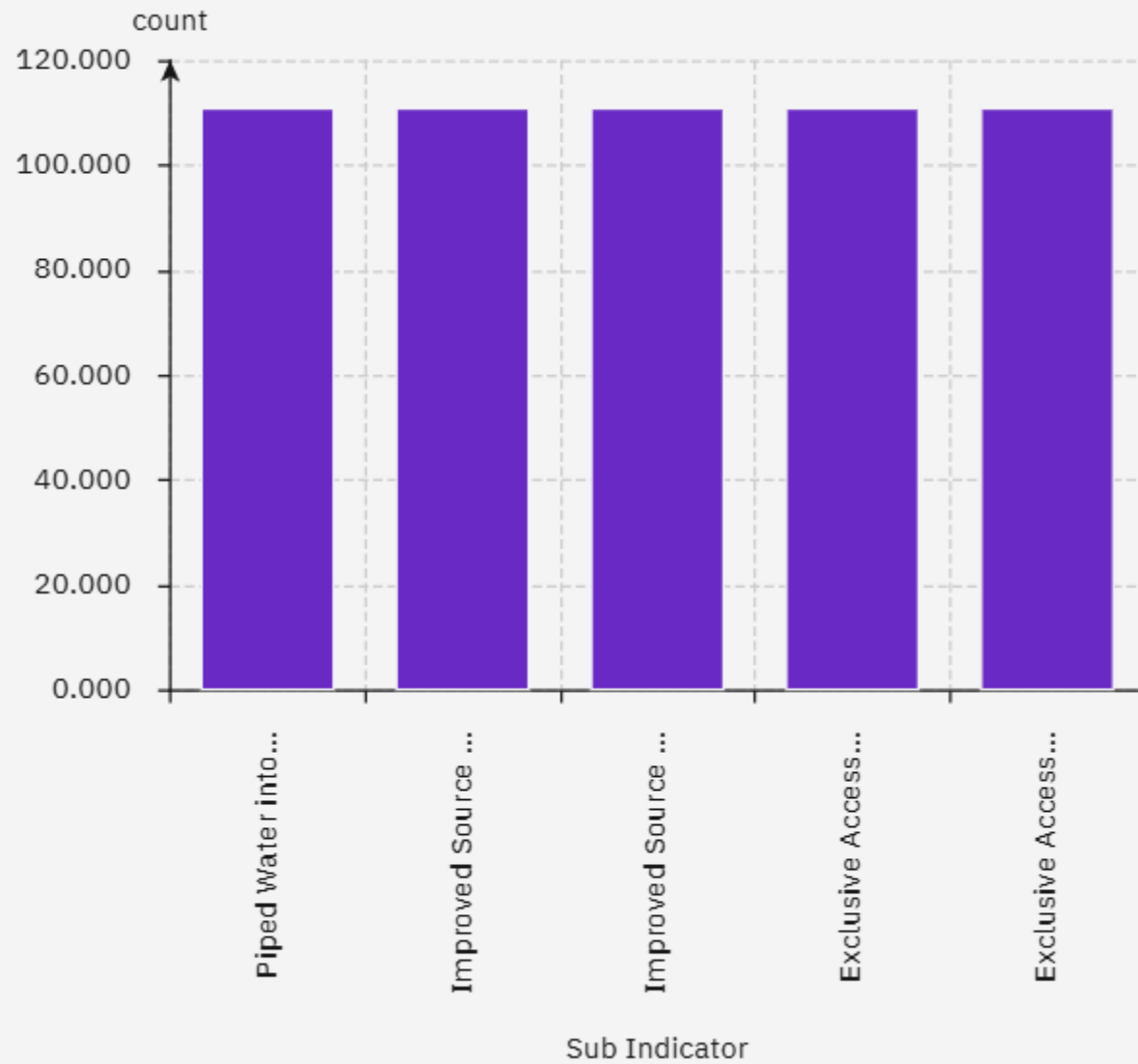
ALGORITHM & DEPLOYMENT

- Import and clean the raw survey data using Python in Watson Studio.
- Analyze access to drinking water by region, gender, and income group.
- Apply correlation analysis with clean cooking fuel and migration data.
- Use classification techniques to predict areas with low access.
- Identify key features contributing to disparities using feature importance.
- Build visual dashboards using IBM Cognos or Watson Visual Recognition.
- Deploy results to IBM Cloud Foundry App or Dashboard service.
- Set up automated refresh for dashboards with updated datasets.

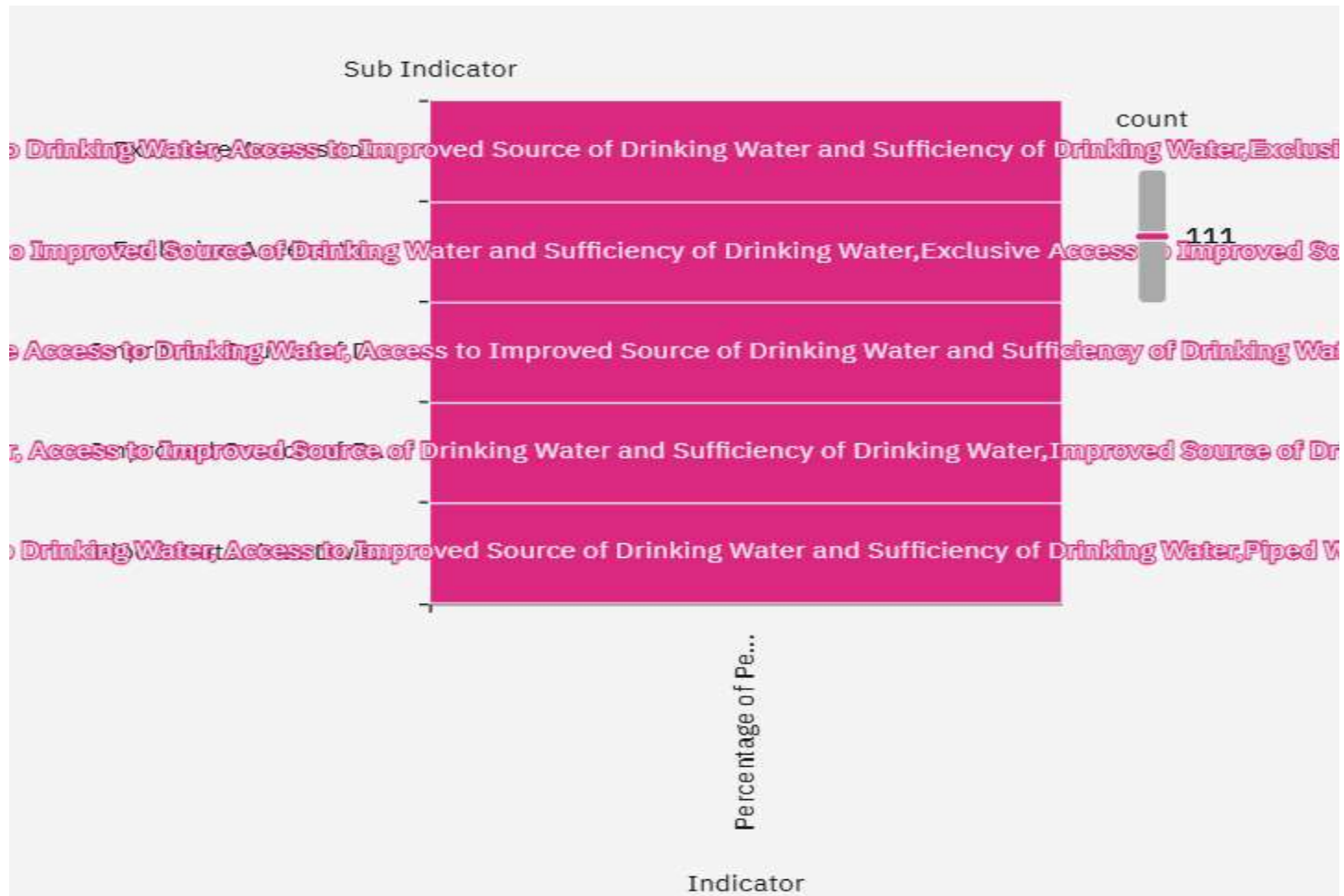
RESULT



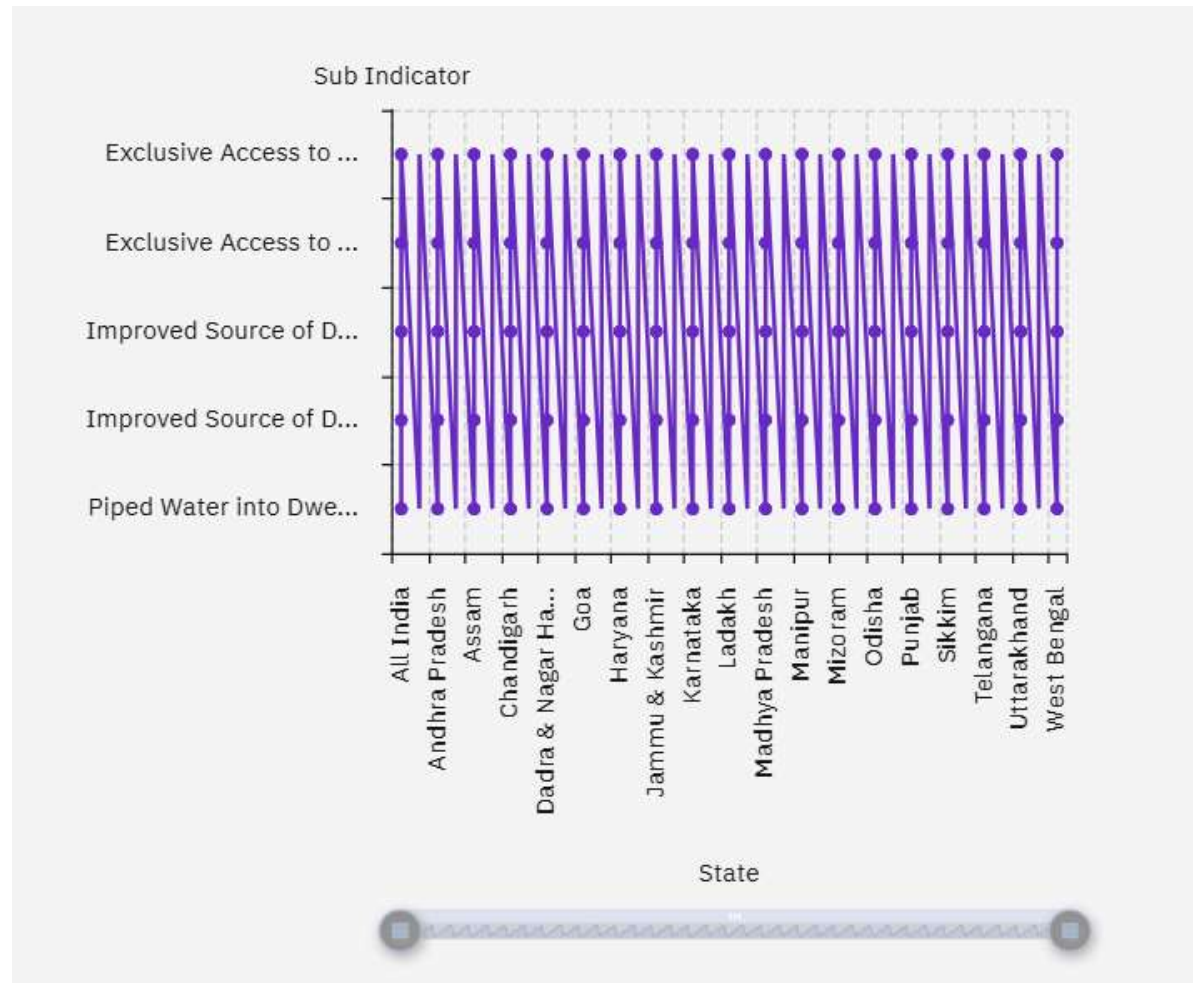
Pie chart representation



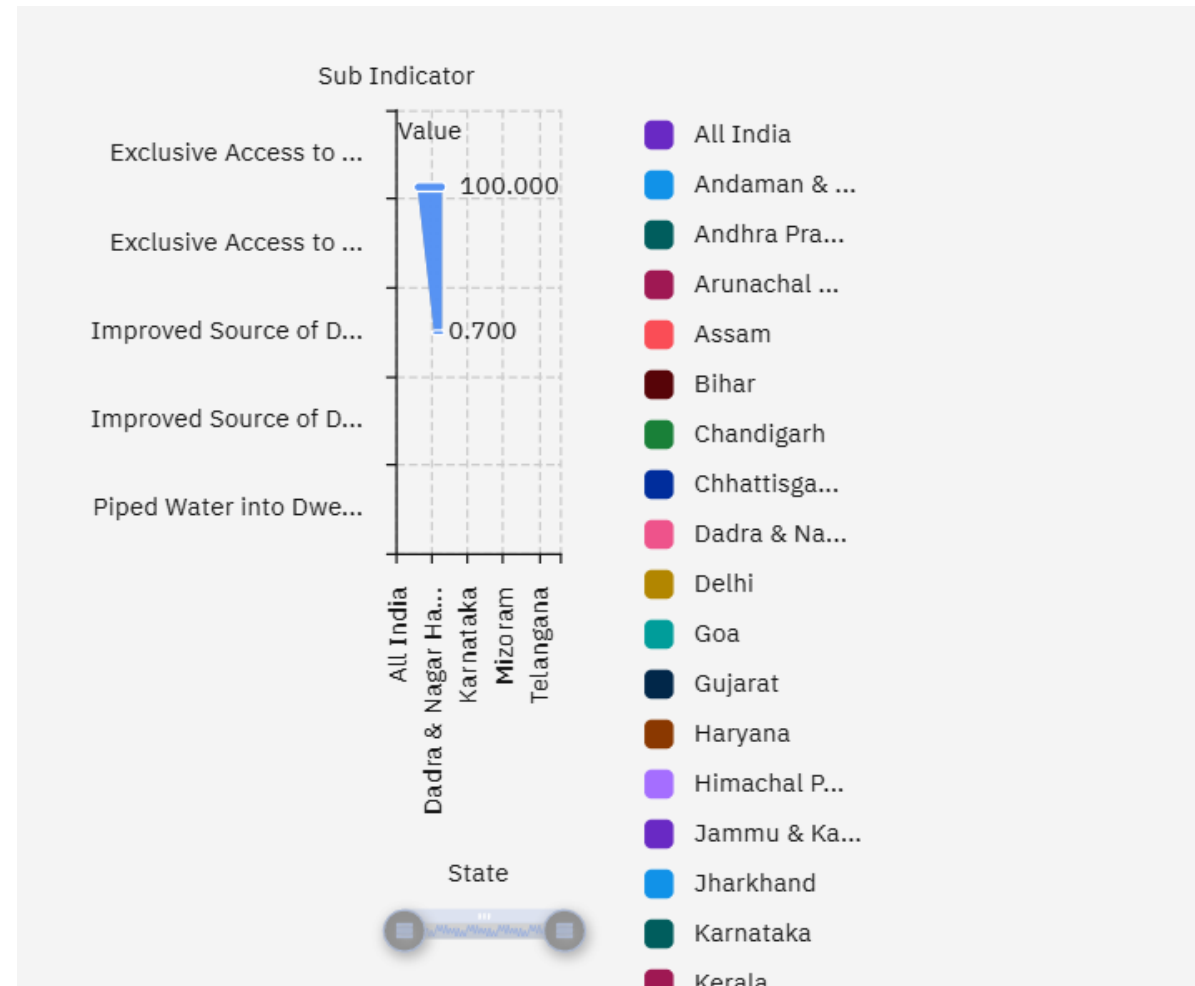
Bar chart representation



Heat map representation



Line chart representation



SCATTER PLOT CHART

CONCLUSION

- Significant disparities in access still exist across Indian states.
- Rural areas lag behind urban in safe water availability.
- Data-backed visualization aids clearer policy formulation.
- IBM Cloud Lite successfully enabled secure and scalable analysis.
- Project demonstrates feasibility of low-cost cloud deployment.
- Supports India's SDG 6 commitment through informed decisions.

FUTURE SCOPE

- Expand analysis to include sanitation and hygiene indicators.
- Integrate real-time IoT data from water quality sensors.
- Collaborate with local governments for targeted interventions.
- Develop a mobile-friendly version of the dashboard
- Include seasonal or weather-based impact on water access.
- Utilize AI/ML models for deeper forecasting and impact analysis.

REFERENCES

- 1. AI Kosh Dataset – [Improved Source of Drinking Water](https://aikosh.indiaai.gov.in/web/datasets/details/improved_source_of_drinking_water_multiple_indicator_survey_78th_round.html)
- IBM Cloud Lite – <https://www.ibm.com/cloud/free>
- IBM Watson Studio Documentation
- MIS 78th Round Methodology – NSSO Official Portal
- Python Libraries: pandas, seaborn, matplotlib, sklearn
- Government of India Water and Sanitation Reports

IBM CERTIFICATIONS

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Learning hours: 20 mins



THANK YOU