APPLICATION DEVELOPMENT

Work in your groups and develop a solution for an industry problem (which you selected in Week 2), using the Node-RED development environment. Node-RED is a visual and wiring tool that connects IoT and edge com- puting systems, such as industrial automation controllers to cloud services, such as Google Cloud Platform, Amazon Web Services IoT, IBM Watson IoT, and Microsoft Azure.The Node-RED development environment simply builds the actual solution using a web browser and a drag-and-drop interface without creating the components of the application from scratch. In fact, Node-RED requires little to no programming skills and 1 it has a steep learning curve for all users with different knowledge and experience levels. IBM has many Node- red tutorials on its developer website https://developer.ibm.com/components/node-red/tutorials.

For seeing the examples of such applications, you can explore and use any of the following online Node-RED tutorials and examples provided below:

Watson'sNode-REDservicesbasicexampleshttps://github.com/watson-developer-cloud/node-red-labs/ blob/master/basic_examples/README.md

Watson'sNode-REDadvancedexampleshttps://github.com/watson-developer-cloud/node-red-labs/ tree/master/advanced_examples

Use Watson's Natural Language Understanding to analyse news articles https://github.com/IBM/ natural-language-understanding-node-red

Generatingdataforanomalydetectionhttps://developer.ibm.com/tutorials/iot-deep-learning-anomaly-det ?
mhsrc=ibmsearch_a&mhq=deep%20learning%20%20red%20flow

Build a low-code chatbot and movie recommender solution using Watson Services and Node-RED https://developer.ibm.com/tutorials/build-a-low-code-chatbot-and-movie-recommender-solution-usin ?
mhsrc=ibmsearch_a&mhq=deep%20learning%20%20red%20flow

A set of Node-RED nodes to access various Google services https://flows.nodered.org/node/ node-red-node-google

Requirements:

(1) You Node-RED flow (application) must use at least three cloud API services.
(2) The Node-RED flow must contain (be connected to) a web application within
    • the Google Cloud Platform or
    • the IBM cloud environment or
    • any other cloud services such as Microsoft or Amazon.
(3) The web application provides a practical solution to business problems using Node-RED technology (node.js) and various cloud services, for example, IBM Watson.
(4) Node-RED flow must have real business applicability and functionality.

(5) Real business applicability and functionality must be supported by some evidence, for example,
statistics or information supported by references.
(6) The Node-RED flow must be more advanced than the flows you have generated in your laboratory
exercises and it cannot be the same as the examples given above or your laboratory exercises.
(7) The Node-RED flow must have at least three function nodes with JavaScript code.

REPORT EXPECTATION

- Each student must submit a Turnitin report for their group activity, outlining the details of steps they completed to build their cloud solution.
- Reports should be submitted by 5pm Friday of Week 9. Students are encouraged to submit their reports earlier.
- This report will contribute 40% of the overall grade.
- Your application development is an engineering process, and like all engineering processes it should be repeatable by an independent party. Therefore, your report should include all details of your development on how you arrived at a conclusion.

The report should be prepared according to the following layout:

– Title Page
– Abstract (Executive Summary)
– Table of Contents
– Introduction
* Scope of Work
* Significance of Development
– Related Works
– Body of Report
* Requirements and Constraints
* Team Members and Responsibilities
* List of Tools Used
* Application Overview
* Cloud Services Used and Operations
* Business Applicability
* Practical Functionality
* Value Proposition and Comparison
– Conclusion and Reflection
– References
– Glossary
– Acknowledgements
– Appendixes

- An abstract condenses the report to concentrate on the essential information
- In your report, briefly describe the application, its business applicability and functionality, the value of the solution to a business, any component of innovation, or a comparison with any similar current business solution and a web application.
- In the significance section, provide a brief description of cloud services used in the application.
- The conclusion starts by referring to the report's purpose, states the main points, draws conclusions, and renders an opinion.
- The conclusion provides students' reflection on their learning experience and challenges they faced in their solution development.
- References and appendixes list the supporting material to which your work refers.
- The maximum word length is 5000 words and the minimum word length is 700.
- There are penalties of 10% per 100 words over 5000 or under the 700 word limit. For example, a report with 5001 words upto 5100 words will receive a 10% penalty. The number of words in the entire document will be counted using a word processor.
- No fancy fonts and 1.5 to double-spacing to be used at all times.
- All work submitted must be authored by the student submitting the work or where material from other sources is included it must be referenced using an IEEE referencing style. – A minimum of 2 references is required.

The report document should be submitted in a Word format only.
Aim to write your report clearly:

– The report should be communicative.
– focus on ideas and organization
– Pay attention to grammar, vocabulary, punctuation and spelling – Lay out ideas in logical order
– Build arguments piece by piece
– Group related ideas and sentences into paragraphs
– Avoid jargon, slang, and colloquial terms

– Define technical terms
* Consider your audience
* Use a natural language style
* Avoid repetition, vague language, and generalisations
* Use active rather than passive voice
* Avoid presenting too many details and personal observations

– Communicate calm, detached observations
– Draw reader's attention to a point
– Assist readers in scanning the text quickly by highlighting the main points and logical development of information
– Use a decimal numbering structure
* Divides material into sections
* Readers can scan heading
* Readers see how parts relate to each other

– All sections must be enumerated, except Abstract, Table of Content, References, Glossary, Acknowledgement, Appendixes.
– Use material such as figures, tables, data, and equations to help tell the story as it unfolds
– Format your report consistently
– Explain your findings, using subheadings to divide the discussion into logical parts
– Save broader generalizations and summaries for the report's conclusion
– Cite references using an IEEE referencing style.

– You can include appendixes containing material such as raw data, figures not used in the body of the report, and anticipated exhibits
* Arrange them in the order referred to in the report.

• **Screenshots/figures/tables:**

– Provide a screenshot of IBM Cloud PaaS (or any other cloud services you used) in relation to the cloud services used.
– Provide a screenshot of your Node-RED flow where the cloud services nodes are visible (back- end).
– Provide a screenshot of your Node-RED debug output (if applicable).
– Provide any other screenshots of your Node-RED application showing the front-end.
– All screen shots should contain the Cloud username of one of the group members, visible in the top-right corner.
– Your report should have at least 5 figures and/or screen shots.
– Your report should have at least 1 table.