Queensland Government | QCAA Queensland Curriculum & Assessment Authority

Queensland Curriculum and Assessment Authority

Digital Solutions 2025 v1.3

IA3: Sample assessment instrument

This sample has been compiled by the QCAA to assist and support teachers in planning and developing assessment instruments for individual school settings.

Student name	sample only
Student number	sample only
Teacher	sample only
Issued	sample only
Due date	sample only

Marking summary

Criterion	Marks allocated	Provisional marks
Determining and Synthesising	7	
Generating	9	
Evaluating	7	
Communicating	2	
Overall	**25**	

Conditions

Technique	Digital solution
Unit	Unit 4: Digital impacts
Topic/s	Topic 1: Digital methods for exchanging data Topic 2: Complex digital data exchange problems and solution requirements Topic 3: Prototype digital data exchanges
Duration	Approximately 15 hours of class time

Mode / length	• Visual and written (including mind maps, models, sketches, diagrams, tables, images, screenshots, schemas): up to 10 A4 pages, including annotations of up to 1500 words
	• Visual and spoken video: up to 2 minutes, demonstrating functionality of
	  – the user interface
	  – data and programmed components.

Individual / group	Individual
Other	Students can develop their responses in class time and their own time.

Context

The rise of smart home devices such as voice assistants, home automation hubs and smart security systems has increased the collection and exchange of personal data. Many users are unaware of how much data their smart devices are collecting, storing and sharing. This lack of awareness poses potential security and privacy risks.

Task

You will apply the problem-solving process to develop a prototype digital solution for a smart home privacy dashboard for either a web or mobile application that allows users to visualise and manage the data flow from their connected devices while ensuring secure data exchange. The solution should provide users with recommendations for enhancing their privacy. Real-time monitoring of the smart home network will be simulated using a sample dataset. See the attached stimulus for detailed requirements.

To complete this task, you must:

- determine success criteria for the identified real-world problem, considering the identified requirements, profiles or personas, data, and information related to data repositories
- synthesise ideas and information to develop the possible solutions for
  - user interfaces
  - data and data repositories
  - programmed components
- generate
  - programmed components for the prototype digital solution demonstrating selection, iteration, user input, and data output
  - a prototype digital solution by combining the user interface, data and programmed components
- evaluate a prototype of the digital solution against criteria, including
  - the accuracy and maintainability of programmed components
  - user experience
- make refinements and recommendations for current and future improvements, justified by user feedback and testing
- evaluate the personal, social and economic impacts of the generated digital solution within the context of the real-world problem
- communicate the development of ideas and the solution for the identified real-world problem.

Stimulus

See attached.

Checkpoints

☐ Term 3 Week 3: Submit identified real-world problem and success criteria for consultation.

☐ Term 3 Week 7: Submit draft response for feedback.

☐ Term 3 Week 10: Submit final response.

Authentication strategies

- You will be provided class time for task completion.
- Your teacher will conduct interviews or consultations as you develop the response.
- You must acknowledge all sources.

Scaffolding

Ensure that your response includes:

- success criteria
- possible solutions for
  - user interfaces
  - data and data repositories
  - programmed components
- potential and desired impacts
- showcase of the prototype digital solution
- evaluations
- refinements and recommendations (based on user testing and feedback).

Instrument-specific marking guide (IA3): Digital Solution response (25%)

Determining and synthesising	Marks
The student response has the following characteristics:	
• astute determination of success criteria • logical synthesis of relevant information and ideas to develop the possible solutions for – user interfaces – secure data and data repositories – programmed components	6–7
• logical determination of success criteria • adequate synthesis of information and ideas to develop the possible solutions for – user interfaces – secure data and data repositories – programmed components	4–5
• reasonable determination of success criteria • simple synthesis of information or ideas to develop the possible solutions for – user interfaces – secure data and data repositories – programmed components	2–3
• identification of a requirement or some criteria • unclear combination of information or ideas to develop data, data repositories, user interface or programmed components.	1
The student response does not match any of the descriptors above.	0

Generating	Marks
The student response has the following characteristics:	
• proficient generation of a prototype digital solution combining – user interface components – data components – programmed components	8–9
• effective generation of a prototype digital solution combining – user interface components – data components – programmed components	6–7
• adequate generation of a prototype digital solution combining – user interface components – data components – programmed components	4–5
• basic generation of a prototype digital solution combining – user interface components – data components – programmed components	2–3
• generation of elements of the prototype digital solution.	1
The student response does not match any of the descriptors above.	0

Evaluating	Marks
The student work has the following characteristics:	
• critical evaluation of features and components against criteria including – user experience – programmed components • critical evaluation of impacts • effective refinements and recommendations justified by – user feedback – testing	6–7
• feasible evaluation of features and components against criteria including – user experience – programmed components • feasible evaluation of impacts • adequate refinements and recommendations justified by – user feedback – testing	4–5
• superficial evaluation of – user experience – programmed components – impacts	2–3
• identification of a change to an idea or a solution.	1
The student work does not satisfy any of the descriptors above.	0

Communicating	Marks
The student response has the following characteristics:	
• effective decision-making about, and fluent use of – visual, written and spoken features to communicate about a solution – language for a technical audience – grammatically accurate language structures – referencing conventions	2
• simple decision-making about, and inconsistent use of – visual, written and spoken features – suitable language – grammar and language structures – referencing conventions.	1
The student response does not match any of the descriptors above.	0

Stimulus

Functional requirements

The app should include:

- user registration with secure authentication
- dashboard interface displaying smart device activity
- simulated real-time monitoring of data transmitted by smart home devices
- security alerts when unusual activity is detected
- customisable privacy settings for different device types.

Non-functional requirements

The app should be easy to use for users of all technical abilities including casual users, tech-savvy users, families and parents.

Usability

Ensure that the app:

- includes an intuitive dashboard for easy identification of security risks
- complies with accessibility standards relevant to the selected technology context (web application or mobile application).

Visual communication

Ensure the app uses graphs, logs and/or other visual data representations.

End-user profile/s

Casual users

Casual users may not be aware of how much data their smart devices transmit. They require simplified privacy settings with recommendations on how to improve their smart home security.

Tech-savvy users

Tech-savvy users prefer customisable options for managing their privacy settings, including manual data exports and encryption controls.

Families and parents

Families are concerned about child safety online and device security. They need clear insights into the devices their children interact with and how to limit data exposure.

Data

Data sources

- The European Union webpage *Dataset of legitimate IoT data* presents network traffic generated by connected Internet of Things (IoT) devices, including voice assistants, smart cameras, connected printers, connected light bulbs, motion sensors etc. It is a static dataset available in CSV format via the Creative Commons API: https://data.europa.eu/data/datasets/617290e5562ea455d3d3ab0d?locale=en

- An XML conversion of the CSV dataset will be provided (smart_home_data.xml). This is a sample of the XML data:

```
▼<root>
  ▼<row>
     <Flow_ID>192.168.20.33-52.46.159.73-50770-443-6</Flow_ID>
     <Src_IP>192.168.20.33</Src_IP>
     <Src_Port>50770</Src_Port>
     <Dst_IP>52.46.159.73</Dst_IP>
     <Dst_Port>443</Dst_Port>
     <Protocol>6</Protocol>
     <Timestamp>30/9/2020 22:01</Timestamp>
     <Flow-Duration>8519035</Flow-Duration>
     <Tot_Fwd_Pkts>24</Tot_Fwd_Pkts>
     <Tot_Bwd_Pkts>21</Tot_Bwd_Pkts>
     <TotLen_Fwd_Pkts>11533</TotLen_Fwd_Pkts>
     <TotLen_Bwd_Pkts>4790</TotLen_Bwd_Pkts>
     <Fwd_Pkt_Len_Max>1460</Fwd_Pkt_Len_Max>
     <Fwd_Pkt_Len_Min>0</Fwd_Pkt_Len_Min>
     <Fwd_Pkt_Len_Mean>480.5416667</Fwd_Pkt_Len_Mean>
     <Fwd_Pkt_Len_Std>657.3029861</Fwd_Pkt_Len_Std>
     <Bwd_Pkt_Len_Max>1460</Bwd_Pkt_Len_Max>
     <Bwd_Pkt_Len_Min>0</Bwd_Pkt_Len_Min>
     <Bwd_Pkt_Len_Mean>228.0952381</Bwd_Pkt_Len_Mean>
     <Bwd_Pkt_Len_Std>477.3634784</Bwd_Pkt_Len_Std>
    ▼<Flow_Byts>
       <s>1916.062089</s>
     </Flow_Byts>
    ▼<Flow_Pkts>
       <s>5.282288428</s>
     </Flow_Pkts>
     <Flow_IAT_Mean>193614.4318</Flow_IAT_Mean>
     <Flow_IAT_Std>943165.1566</Flow_IAT_Std>
     <Flow_IAT_Max>5999337</Flow_IAT_Max>
     <Flow_IAT_Min>49</Flow_IAT_Min>
     <Fwd_IAT_Tot>6552483</Fwd_IAT_Tot>
     <Fwd_IAT_Mean>284890.5652</Fwd_IAT_Mean>
     <Fwd_IAT_Std>1256420.664</Fwd_IAT_Std>
     <Fwd_IAT_Max>6045471</Fwd_IAT_Max>
     <Fwd_IAT_Min>49</Fwd_IAT_Min>
     <Bwd_IAT_Tot>8436622</Bwd_IAT_Tot>
     <Bwd_IAT_Mean>421831.1</Bwd_IAT_Mean>
     <Bwd_IAT_Std>1387148.979</Bwd_IAT_Std>
     <Bwd_IAT_Max>6002314</Bwd_IAT_Max>
     <Bwd_IAT_Min>55</Bwd_IAT_Min>
     <Fwd_PSH_Flags>0</Fwd_PSH_Flags>
     <Bwd_PSH_Flags>0</Bwd_PSH_Flags>
     <Fwd_URG_Flags>0</Fwd_URG_Flags>
     <Bwd_URG_Flags>0</Bwd_URG_Flags>
     <Fwd_Header_Len>512</Fwd_Header_Len>
     <Bwd_Header_Len>432</Bwd_Header_Len>
```

Data repositories

Must comply with the Australian Privacy Act (1988).