

# Generative AI-Resistant Assessment Design

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IIBIT/FedUni

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<b>Wimmera:</b>	Wotjobaluk, Jaadwa, Jadawadjali, Wergaia, Jupagulk
<b>Ballarat:</b>	Wadawurrung
<b>Berwick:</b>	Boon Wurrung
<b>Gippsland:</b>	Gunai Kurnai
<b>Nanya Station:</b>	Mutthi Mutthi and Barkindji
<b>Brisbane:</b>	Turrbal and Jagera

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# Short Quiz

Please scan the QR code below to answer two questions



# Introduction

- This presentation is based on our experience while developing assessments for Master of Technology (FedUni) and Diploma of Advanced Programming units
- We faced challenges when using traditional assessments after the introduction of Generative AI tools
- Aim is to facilitate students' learning rather than using AI to substitute learning process
- This is based on programming subjects only

# Content

- Why Traditional Assessment Techniques Need an Overhaul
- Strategies for Developing Generative AI-Resistant Assessments
- Our Approach - 2 Case studies
- Challenges
- Feedback
- Conclusion

- **Why Traditional Assessment Techniques Need an Overhaul**
  - Generative AI can produce human like text effortlessly
  - Students can easily exploit AI to write answers for assignments and open book examinations
  - Generative AI is replacing learning if assessments are not updated
  - Generative AI should enhance learning instead of replacing the learning

# Strategies for Developing Generative AI-Resistant Assessments

- **Allow students to use AI**
  - Clearly specify where to use and encourage critical thinking and creativity
  - Emphasise analysis, synthesis and evaluation
  - Application of knowledge in the tasks
  - Personal reflection and analysis
- **Scaffold assignments to include several stages (Sawyer, 2005)**
  - Breakdown a complex task into smaller parts
  - Provide guidance and support at each stage/part
  - Feedback at intermediate stages

# Strategies for Developing Generative AI-Resistant Assessments (Cont.)

- **Incorporating metacognitive components (Pintrich, 2002)**
  - o awareness and control of one's cognitive processes
  - o Include reflective prompts that encourage students to think about their thought processes, decision-making, and learning strategies
- **Use of project/case-study based assessments**
- **Use of open-ended questions**
- **Interviews and Presentations**
- **E-Supervised exams**



# Case Study 1 - ICTPRG443 - Apply Intermediate Programming Skills Unit

- **Original Task (Assessment consists of multiple parts and this is only one task):**
  - Choose 3 of the following data structures
  - Compare the performance when appending elements to the chosen data structures.
  - Which data structure performance better and explain why.

Data Structures: List, Stack, Queue, Linked List, Binary Trees

# Case Study 1 - ICTPRG443 - Apply Intermediate Programming Skills Unit

- **Revised Task:**

Use the given Python code append one million records (use the product.txt file) to the following data structures and compare the performance when appending elements to the data structure.

1. List the time taken (in milliseconds) to append the elements to each data structure.
2. Which data structure performance better and explain why?

Data Structures: List, Stack, Queue, Linked List, Binary Trees

# Case Study 2 – ITECH7409 – Software Testing Unit

- **Original Task:**
- **Research on software testing standards**
- Locate a research paper related to software testing that refers to at least one standard.
- Research, comprehend and analyse each document (both the paper and the chosen standard) to find relevant details to answer a set of questions, and
- Prepare a written summary report of findings

# ITECH7409 Revised assignment

**A code base (small project) having multiple modules in Python is given for the student to understand and carry out the tasks given under.**

- Follow the checklist in week 3 lecture, slide 19 to make a comprehensive code review.
- Define and create unit test cases (black box and white box testing), following the techniques provided in lecture 4 slides.
- Compute Cyclomatic Complexity with the help of a flow graph.
- Write a quality report

# Challenges

- Requires crafting the questions carefully, as surface level questions are easily answered by Generative AI
- Assessments must be designed to encourage critical thinking
- Must continuously update/redesign the assessments as the Generative AI is continuously getting updated
- Need to incorporate methods for identifying authentic, and student created work (can ask the students identify where they used AI)
- Real world and dynamic case studies are more likely to be resistant to Generative AI, which require time and effort to create

# Feedback

- Our observations confirms
  - Students demonstrated better understanding of the tested concepts as the students have to apply the gained knowledge and skills
  - Quality of the solutions comparatively better (or improved)
  - Active engagement
  - Comparatively less academic misconduct incidents

# Conclusion

- Based on the feedback from students modified assessments provided better learning outcomes
- Process could be iterative as lesson learnt from the previous can be applied to the next
- Could be challenging in some areas and multiple techniques may need to be used

# Reference

- *Sawyer, R. K. (Ed.). (2005). The Cambridge handbook of the learning sciences. Cambridge University Press.*
- *Pintrich, P. R. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. Theory into practice, 41(4), 219-225.*





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