



## HIGHER EDUCATION PROGRAMMES

Academic Year 2024:	July - December
Formative Assessment 1:	Systems Development 2 (HSYD201-1)
NQF Level, Credits:	6, 40
Weighting:	25%
Assessment Type:	Essay questions/Practical
Educator:	Odwa Dyantyi
Examiner:	Odwa Dyantyi
Due Date:	13 September 2024
Total:	100 marks

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### Instructions:

- This formative assessment consists of THREE Questions.
- The assessment is based on units 1 – 3 (Chapters 9 – 11 of the Java Programming Textbook).
- All questions are compulsory.
- **Submit a single PDF file with a cover page containing your details and ALL your answers.**
- A **Copyleaks Report** will be issued via ColCampus once the assignment is submitted. Please ensure that you follow the correct steps when uploading your assignment, to ensure that the Copyleaks Report is correctly issued. If the incorrect document is uploaded, or if no Copyleaks Report is issued, a mark of zero (0) will be awarded. If the Copyleaks Report indicates that a 30% similarity/plagiarism score has been exceeded, 25% of the assessment total will be deducted from the final grade.

**The assessment covers the following learning outcomes:**

- Describe object-oriented inheritance.
- Define base class, superclass, and parent class.
- Derive a subclass from an existing class (Extend classes).
- Use base class and derived class methods with a derived class object.
- Call constructors during inheritance.
- Access superclass methods.
- Employ information hiding.
- Describe exceptions.
- Try code and catch exceptions.
- Use the Path and Files classes.
- Describe file organization, streams, and buffers.
- Write records to a random-access data file.
- Read records from a random-access data file.

**Question 1**

**[22 marks]**

As a librarian, your responsibility is to create a software system for organising the library's book collection. Your team has chosen to apply object-oriented programming principles, specifically on inheritance, to represent various book types and their features effectively.

1.1 Describe object-oriented inheritance in the context of your project. How does it enhance code organisation and reusability? (4 marks)

1.2 How would you derive a subclass "FictionBook" from an existing class "Book" in your library management system project? Provide an example. (18 marks)

## Question 2

[78 marks]

As a software engineer, you are currently involved in a data file processing and management project. Your team's specific assignment is to implement file-handling features using Java. The primary focus areas include handling exceptions, performing file input/output (I/O) operations, and managing random-access data files.

2.1 Describe exceptions in Java and how they are relevant to file-handling operations in your project. (4 marks)

2.2 Demonstrate how you would try code and catch exceptions during file handling operations in your project. Provide an example. (23 marks)

2.3 How would your project use the Path and Files classes for file-handling operations? (22 marks)

2.4 Describe file organisation, streams, and buffers in the context of your project. (5 marks)

2.5 Explain how you would write records to a random-access data file in your project. (24 marks)