1st SIT Coursework - 01 Question Paper **Year Long 2024 2025**

Module Code:	**CS5003NI**
Module Title:	**Data Structures and Specialist Programming**
Module Leader:	**Mr. Prithivi Maharjan (Islington College)**

Coursework Type:	Individual
Coursework Weight:	This coursework accounts for 30% of your total module grades.
Submission Date:	Week 12
Coursework is given out:	Week 7
Submission Instructions:	Submit the following to the Islington College's MST portal before 01:00 PM on the due date: • A report (document) in .pdf format in the MST portal or through any medium which the module leader specifies.
Warning:	London Metropolitan University and Islington College takes Plagiarism seriously. Offenders will be dealt with sternly.

PLAGIARISM

You are reminded that there exist regulations concerning plagiarism. Extracts from these regulations are printed overleaf. Please sign below to say that you have read and understand these extracts:

Extracts from University Regulations on Cheating, Plagiarism and Collusion

Section 2.3: “The following broad types of offence can be identified and are provided as indicative examples ….

Cheating: including taking unauthorised material into an examination; consulting unauthorised material outside the examination hall during the examination; obtaining an unseen examination paper in advance of the examination; copying from another examinee; using an unauthorised calculator during the examination or storing unauthorised material in the memory of a programmable calculator which is taken into the examination; copying coursework.

Falsifying data in experimental results.

Personation, where a substitute takes an examination or test on behalf of the candidate. Both candidate and substitute may be guilty of an offence under these Regulations.

Bribery or attempted bribery of a person thought to have some influence on the candidate’s assessment.

Collusion to present joint work as the work solely of one individual.

Plagiarism, where the work or ideas of another are presented as the candidate’s own.

Other conduct calculated to secure an advantage on assessment.

Assisting in any of the above.

Some notes on what this means for students:

Copying another student's work is an offence, whether from a copy on paper or from a computer file, and in whatever form the intellectual property being copied takes, including text, mathematical notation, and computer programs.

Taking extracts from published sources *without attribution* is an offence. To quote ideas, sometimes using extracts, is generally to be encouraged. Quoting ideas is achieved by stating an author's argument and attributing it, perhaps by quoting, immediately in the text, his or her name and year of publication, e.g. “$e = mc^2$ (Einstein 1905)". A *reference* section at the end of your work should then list all such references in alphabetical order of authors' surnames. (There are variations on this referencing system which your tutors may prefer you to use.) If you wish to quote a paragraph or so from published work then indent the quotation on both left and right margins, using an italic font where practicable, and introduce the quotation with an attribution.

School of Computing, FLSC

CONTRACT CHEATING

Contract cheating (also known as assessment outsourcing, commissioning or ghost writing) is when someone seeks out another party, or AI generator service, to produce work or buy an essay or assignment, either already written or specifically written for them or the assignment to submit as their own piece of work.

Contract cheating undermines the integrity of the academic process and devalues the qualifications awarded by the university. Students are reminded that academic integrity is a fundamental principle of our institution. Engaging in contract cheating not only impacts the individual's academic record but also the reputation of the university.

Students are encouraged to seek support if they are struggling with their coursework. The university offers a range of resources, including academic counseling, tutoring services, and workshops on study skills and time management. Utilizing these resources can help students achieve their academic goals without resorting to dishonest practices.

Penalty:

- Failure in the Module: The student must re-register for the same module, and the re-registered module will be capped at a bare pass.
- Ineligibility to Continue on the Course: Where re-registration of the same module, or a suitable alternative, is not permissible, the student will not be able to continue on the course. Additionally, the following penalty will be applied to the student's final award:
    - Undergraduate Honors: The student's final classification will be reduced by one level.
    - Unclassified Bachelors: Downgraded to Diploma in Higher Education.
    - Foundation Degree: Distinction downgraded to Merit; Merit downgraded to Pass; Pass downgraded to Certificate in Higher Education.
    - Masters: Distinction downgraded to Merit; Merit downgraded to Pass; Pass downgraded to Postgraduate Diploma.

Reporting and Consequences:

Instances of contract cheating will be thoroughly investigated, and students found guilty will face the penalties outlined above. It is the responsibility of every student to ensure that their work is their own and to avoid situations that could lead to accusations of academic misconduct.

By adhering to these standards, students contribute to a fair and equitable academic environment, ensuring the value and recognition of their qualifications are maintained.

Deliverables

You are required to submit two components before the submission deadline.

1. Dynamic System:
   - The **project** must be uploaded to a **GitHub** repository.
2. Report in PDF format.
   - Provided report structure and guidelines in **Task B** should be included.
   - Additionally, in your cover page include **a link to the GitHub repository** in your report, ensuring that the repository is publicly accessible.

Task A: System Development

Please note that the scenario described below cannot be used as your coursework project. You are required to propose a new and original project idea that is distinct from any other projects from students and does not align with the provided project scenario.

Project Scenario

For example, if we propose a **Student Management System (SMS)** named as **"CollegeApp",** as our coursework project, the system would serve as a comprehensive web-based platform to **manage student-related activities** within an educational institution from admin side. This project would allow students to explore key aspects of web development, including **utilization of SWING components, static CRUD operations, effective use of data structure and others.**

The detailed information on system components is explained below

1. **MVC Architecture [5 marks]**
    a. The system will be developed using the **Model-View-Controller (MVC)** architecture, which separates the application into three interconnected components.
        i. The **Model** component to manage the data of student records.
        ii. The **View** component, built with JFrame, will be responsible for presenting data to users.
        iii. The **Controller** will process user requests, coordinate with the Model and View to retrieve or update data, and determine the appropriate View to display.
2. **Frontend Design and Development [5 marks]**
    a. The user interface should be built beautifully using **Java JFrame** file considering the UI/UX design applications. Responsive design is not required.
3. **Use of Appropriate Data Structure [5 marks]**
    a. Data structure concepts like Lists, ArrayList, LinkedList, Stack, and Queue must be appropriately include in the project finding out the best scenario to implement.
4. **Admin Dashboard: [10 marks]**
    a. Data used in this dashboard should be real time data. At least 5 data should be loaded when this screen is opened using appropriate data structure.
    b. The admin dashboard would enable administrators to manage student records by **creating, updating, deleting, and viewing** detailed information such as personal data (e.g., name, date of birth, contact details) and academic data (e.g., courses enrolled, grades, attendance).
5. **Search Feature [5 marks]**

    The system will include a search feature that allows to find the students information, using a **search bar** using binary search algorithm.
6. **Sort Feature [5 marks]**

    The system should also include the sort feature that allows to arrange data either from ascending or descending order. Use the most applicable algorithms to complete this feature.
7. **Home Screen [5 marks]**
    a. This screen should greet the users to the project and show the crucial information.

Other Program Requirements: [10 marks]

1. **Validation and Exception Handling:**
    - During the data registration process, it is imperative to implement validation checks to verify the existence of an account. This can be done by cross-referencing a unique identifier, such as a phone number, to ensure that the account does not already exist.
    - Proper exception handling mechanisms must be in place to manage potential errors gracefully in entire system.
2. **Programming Styles:**
    - The Java code should follow standard naming conventions and include meaningful comments to enhance code readability and maintainability. These practices are crucial for maintaining clarity in the code and ensuring that it adheres to professional standards.
3. **Proper Use of Classes and Methods:**
    - Object-oriented programming principles should be applied efficiently to reduce code redundancy. This involves utilizing methods and classes effectively to create a clean and modular codebase, emphasizing reusability and maintainability.
4. **Use of Proper Messages:**
    - When creating a new account, the system must provide appropriate prompts if any entered information is invalid. For example, if a user enters numerical data in the full name field, the system should alert the user with a clear and specific error message, guiding them to correct the input.

Task B: Report

Word Count: 12,000 (word count starts from introduction till conclusion.)

Note that you must appropriately follow the report structure and styles. [8 marks]

1. **Introduction**

   This section should include a clear and concise introduction to the project, covering the following elements:

   - **Title**: Provide a descriptive title for your project.
   - **Purpose**: Explain the purpose of the project and why it is being developed.
   - **Audience**: Identify the intended audience for your application.
   - **Aims and Objectives**: Outline the main aims and objectives that the project seeks to achieve.

2. **Wireframe [8 marks]**

   - Present the wireframes of your application alongside your prototype designs, showing the layout and structure of the user interface. This should include all major screens, such as the login page, dashboard, and any other key pages.

3. **Java Classes and Methods Explanation [8 marks]**

   - Provide a concise explanation of the Java classes used in your application. This section should include:

     i. **Class Diagram**: A visual representation of the classes, their relationships, and interactions.

     ii. **Methods Explanation**: For each Java class, list the methods used and explain their purpose and functionality.

4. **Test Cases [10 marks]**

   - When documenting your test cases, ensure that each test case is thoroughly detailed with a comprehensive test table and clear steps to achieve the expected result. This section should demonstrate the full range of tests conducted to validate the functionality and robustness of your project.

5. **Coursework Development [8 marks]**

   Document the development process of your coursework, including the tools used to complete the system. For each tool, provide:

   - **Tool Description**: What the tool is and its primary purpose.
   - **Usage**: How the tool was used in the development process.
   - **Evidence**: Include screenshots or other evidence demonstrating the use of the tool.\

   Include the topics like Algorithms implementation, data structure implementation and so on.

6. **Critical Analysis [8 marks]**

   Conduct a critical analysis of the system, evaluating its performance and identifying any challenges or difficulties encountered during development. This section should include:

   1. **System Breakdown**: Discuss any issues, errors, or obstacles faced during development, supported by evidence such as screenshots.
   2. **Evaluation**: Provide your opinion on the overall effectiveness of the system.

7. **Conclusion**

   Summarize the key findings from your coursework. Reflect on what you have learned, any challenges faced, and how you overcame them. Consider the overall success of the project and any areas for future improvement.

8. **References (Bibliography)**

   List all the sources referenced throughout your report in a properly formatted bibliography.

Important Details:

1. **Mandatory Use of Technologies:**
   Failure to incorporate required technologies such as Java, SWING/ANT, may result in an automatic failure of the coursework.

2. **Program Functionality:**
   Ensure that your program operates correctly on at least two different PCs prior to submission to avoid technical issues.

3. **Viva Attendance:**
   Non-attendance at the viva examination will lead to a failure in the system evaluation.

Task C: Milestone

Milestone submission is one of the most critical part of this coursework. Students are required to submit the coursework in 2 milestone. Further details are provided below.

A. Milestone 1

[Submission Week: 9]

In milestone 1 you are required to submit the mentioned points in pdf format by finalizing your development task. The milestone 1 is divided in to 3 parts

Part 1: Wireframe design

Part 2: ANT Project Creation by implementing MVC architecture including complete UI/UX development.

Part 3: Create, Read, Update and Delete (CRUD) functionality implementation with full validation.

Note that you should include each session mentioned in milestone including code

B. Milestone 2

[Submission Week: 11]

In milestone 2 you are required to submit following things in pdf format by finalizing your development task.

Part 1: Implementation of sorting and searching functionality using algorithms

Part 2: Finalizing your project development and report.

Note that inconsistency in milestone submission may lead to failure