SCIT

School of Computing and Information Technology

Spring 2020
CSIT121/821 — Programming Fundamentals

Assignment 2 (10 marks)

Due Time and Date:

Due by Sunday 11th October 2020 10 pm

General Requirements:

- You should create your programs with good programming style and form using proper blank spaces, indentation and braces to make your code easy to read and understand;
- You should create identifiers with sensible names;
- You should make comments to describe your code segments where they are necessary for readers to understand what your code intends to achieve.
- Logical structures and statements are properly used for specific purposes.
- Read the assignment specification carefully, and make sure that you follow whatever directed in this assignment. In every assignment that you will submit in this subject, you must put the following information in the header of your program:

```
/*-------------------------------------------------------
My name:
My student number:
My course code: CSIT121
My email address:
Assignment number: 2
-------------------------------------------------------*/
```

Objectives

This assignment requires you to write a program in Java that help two students to enrol into the Bachelor of Computer Science course and the Master of Computer Science course, respectively. You will be asked to use the OOP concepts such as the inheritance, polymorphism, abstract class/method, and interface to implement the program.

Background

Assignment 2 is based on the Assignment 1 (please see Moodle for Assignment 1's solution). Please refer to Assignment 1's description for the Bachelor of Computer Science course structure. In Assignment 2, the Master of Computer Science course will be added.

The Master of Compute Science course contains three parts, i.e., the core subjects, the majors and the elective subjects. In order to complete the course, students shall complete at least 96 credit points.

1. All students shall complete 8 core subjects, i.e., 54cp in total.

Course Structure

This degree requires satisfactory completion of:

Subject Code	Subject Name	Credit Points	Session(s)
Year 1			
CSCI814	IT Project Management	6	Autumn, Spring
CSCI851	Advanced Programming	6	Autumn, Spring
CSCI803	Algorithms and Data Structures	6	Spring
Select one of the following			
CSCI835	Database Systems	6	Autumn, Spring
Plus one of the following			
MTS9302	Corporate Network Management	6	Autumn
And			
CSIT940	Research Methodology	6	Autumn, Spring
Year 2			
CSCI920	Contemporary Topics in Computer Science	6	Autumn
Students must take one of the following:*			
CSCI992	Professional Project	12	Annual, Spring 2019/Autumn 2020

2. All students shall complete a major with three subjects, i.e., 18cp in total. The course contains four majors and each student can only select one major. The four majors are Intelligent Systems, Machine Learning and Big Data, Network and Information Security, and Software Engineering. The core subjects of each major are displayed in the following snapshots.

Intelligent Systems

Subject Code	Subject Name	Credit Points	Session(s)
CSCI964	Computational Intelligence^	6	Autumn
CSCI924	Reasoning and Learning	6	Spring
CSCI944	Perception and Planning	6	Spring

Machine Learning and Big Data

Subject Code	Subject Name	Credit Points	Session(s)
CSCI933	Machine Learning Algorithms and Applications	6	Autumn
CSCI935	Computer Vision Algorithms and Systems	6	Spring
CSCI946	Big Data Analytics^	6	Spring

Network and Information Security

Subject Code	subject Name	Credit Points	Session(s)
CSCI968	Advanced Network Security^	6	Autumn
INFO912	Mathematics for Cryptography	6	Autumn
CSCI971	Advanced Computer Security	6	Spring

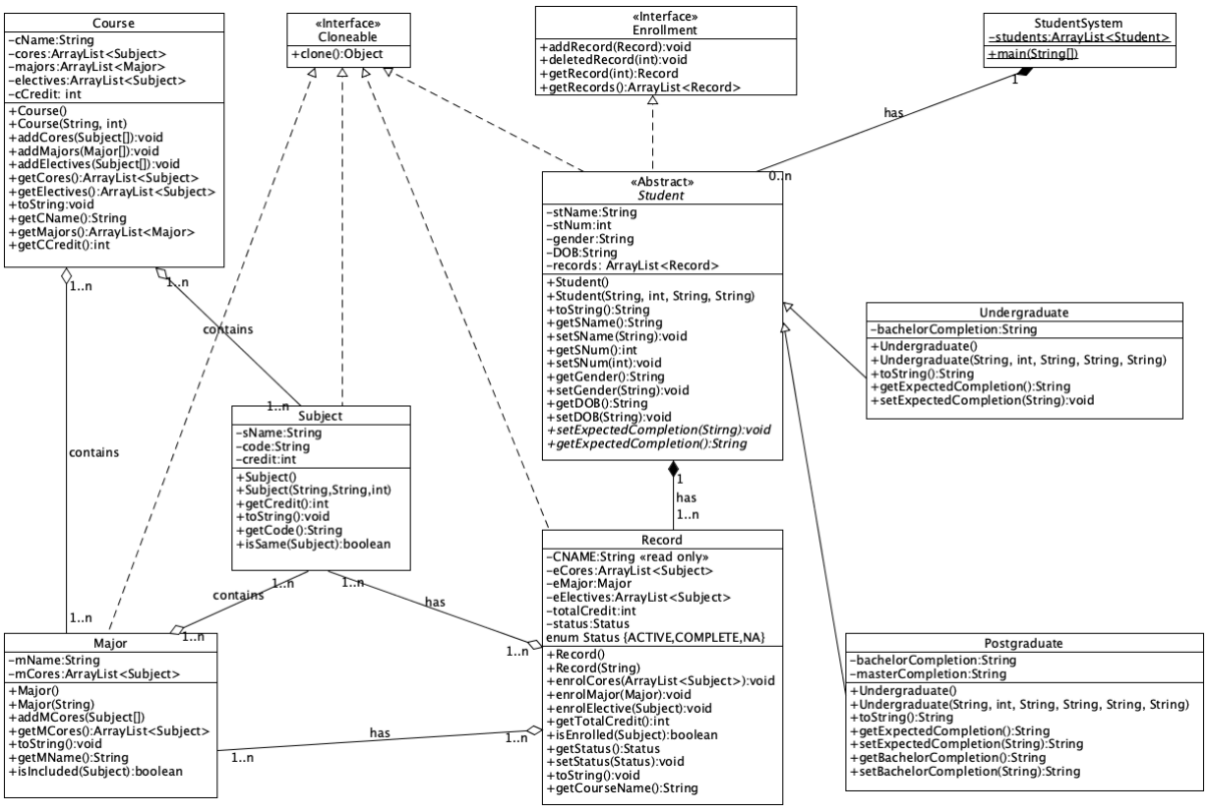
Software Engineering

Subject Code	Subject Name	Credit Points	Session(s)
CSCI910	Software Requirements, Specifications and Formal Methods^	6	Autumn
CSCI926	Software Testing and Analysis	6	Autumn
CSCI927	Service-Oriented Software Engineering	6	Spring

3. All students shall enrol 4 elective subjects to make up 96 credit points. (Students are allowed to enrol more than 96 credit points). The elective subjects are the collection of subjects from all four major cores plus the following six subjects.

CSCI862	System Security	6	Spring
CSIT826	Human Computer Interaction	6	Spring
ISIT925	Strategic Network Design	6	Spring
ECTE903	Image and Video Processing	6	Spring
INFO911	Data Mining and Knowledge Discovery	6	Autumn
INFO913	Information Theory	6	Not offered in 2019

4. You are required to design, implement and test a student system to enrol two students into the Bachelor of Computer Science course and the Master of Computer Science, respectively. The UML class diagram of the system is given as below. You can add new classes, or fields and methods for the existing classes, but **can't** delete any existing classes, fields or methods (The .uxf file of the class diagram is also provided. The .uxf file can be opened by Umlet and you can modify the class diagram based on your new design).



5. The StudentSystem class (primary class)

The StudentSystem class is the primary class and contains the main() method and a static students field. In Assignment 2, the following steps shall be competed inside the main() method. Please note the following steps shall be conducted consequentially without re-running the program.

i) to create all subjects, majors, and courses based on the Bachelor of Computer Science (see Assignment 1 description for BCS hardcode) and the Master of Computer Science structures. You can use the following hardcore or your own way to create the subject, major and course objects;

```
// create the master of comptuer science course
Subject CSCI814 = new Subject("CSCI814", "IT Project Management", 6);
Subject CSCI851 = new Subject("CSCI851", "Advanced Programming", 6);
Subject CSCI803 = new Subject("CSCI803", "Algorithms and Data Structures", 6);
Subject CSCI835 = new Subject("CSCI835", "Database Systems", 6);
Subject CSCI862 = new Subject("CSCI862", "System Security", 6);
Subject CSIT826 = new Subject("CSIT826", "Human Computer Interaction", 6);
Subject MTS9302 = new Subject("MTS9302", "Corporate Network Management", 6);
Subject ISIT925 = new Subject("ISIT925", "Strategic Network Design", 6);
Subject CSIT940 = new Subject("CSIT940", "Research Methodology", 6);
Subject CSCI920 = new Subject("CSCI920", "Contemporary Topics in Computer Science", 6);
Subject CSCI992 = new Subject("CSCI992", "Professional Project", 12);
Subject CSCI964 = new Subject("CSCI964", "Computational Intelligence", 6);
Subject CSCI924 = new Subject("CSCI924", "Reasoning and Learning", 6);
Subject CSCI944 = new Subject("CSCI944", "Perception and Planning", 6);
Subject CSCI933 = new Subject("CSCI933", "Machine Learning Algorithms and Applications", 6);
Subject CSCI935 = new Subject("CSCI935", "Computer Vision Algorithms and Systems", 6);
Subject CSCI946 = new Subject("CSCI946", "Big Data Analytics", 6);
Subject CSCI968 = new Subject("CSCI968", "Advanced Network Security", 6);
Subject INFO912 = new Subject("INFO912", "Mathematics for Cryptography", 6);
Subject CSCI971 = new Subject("CSCI971", "Advanced Computer Security", 6);
Subject CSCI910 = new Subject("CSCI910", "Software Requirements, Specifications and Formal Methods", 6);
Subject CSCI926 = new Subject("CSCI926", "Software Testing and Analysis", 6);
Subject CSCI927 = new Subject("CSCI927", "Service-Oriented Software Engineering", 6);
Subject ECTE903 = new Subject("ECTE903", "Image and Video Processing", 6);
Subject INFO911 = new Subject("INFO911", "Data Mining and Knowledge Discovery", 6);
Subject INFO913 = new Subject("INFO913", "Information Theory", 6);

Major intSys = new Major("Intelligent System");
Subject[] intSysCores={CSCI964, CSCI924, CSCI944};
intSys.addMCores(intSysCores);

Major macLearBD = new Major("Machine Learning and Big Data");
Subject[] macLearBDCores={CSCI933,CSCI935,CSCI946};
macLearBD.addMCores(macLearBDCores);

Major NetInfoSec = new Major("Network and Information Security");
Subject[] NetInfoSecCores={CSCI968,INFO912,CSCI971};
NetInfoSec.addMCores(NetInfoSecCores);

Major softEngM = new Major("Software Engineering");
Subject[] softEngMCores={CSCI910, CSCI926, CSCI927};
softEngM.addMCores(softEngMCores);

Major[] MCSMajors = {intSys, macLearBD, NetInfoSec, softEngM};

Subject[] cCoresM={CSCI814, CSCI851, CSCI803, CSCI835, MTS9302, CSIT940, CSCI920, CSCI992};

Subject[] cElesM= {CSCI862,CSIT826,ISIT925,CSCI964,CSCI924,CSCI944,CSCI933,
CSCI935,CSCI946,CSCI968,INFO912,CSCI971,CSCI910,CSCI926,CSCI927,ECTE903,INFO911,INFO913};

Course mcs = new Course("Master of Computer Science", 96);
mcs.addCores(cCoresM);
mcs.addMajors(MCSMajors);
mcs.addElectives(cElesM);
```

ii) to enrol the first student to the Bachelor of Computer Science course. The program shall display the BCS structure first and ask the user to input the first student's information (see the below example for details). Then the system will create the first student object (declared with the Student class and created with Undergraduate class constructor). The system will automatically enrol the student to all BCS core subjects and ask the student to select a major and several elective subjects to complete the enrolment. This procedure is same as what you did in Assignment 1. However, in Assignment 2, a Record object shall be created first based on the first student's enrolment information, then the Record object shall be added to the first student's records list.

iii) to enrol the second student to the Master of Computer Science course. It is assumed that the second student already completed his/her Bachelor of Computer Science course with the exact same subjects as the first student. Therefore, a clone of the first student's BCS record will be created and added to the second student's enrolment record first automatically. Then the system will enrol the second student to the Master of Computer Science course. The detailed steps are:

a) to displayer the welcome information for the second student and display the Master of Computer Science course structure to the second student;
b) to create the second student object (declared with Student class and created with Postgraduate class constructor) and ask the second student input some personal details.

Very similar as the information provided by the first student, but the second student needs to provide the completion session and year for this/her bachelor degree;

c) to create a clone object (deep clone) of the first student's BCS record, modify the clone object's status to COMPLETE, and add the clone object to the second student's enrolment record list;
d) to automatically enrol the second student to all core subjects of MCS, and ask the second student to select a major and 4 elective subjects to complete the enrolment. The second student's enrolment record of MCS shall be kept by another Record object (the status shall be ACTIVE). The second Record object shall be added to the second student's records list finally;
e) to add the Undergraduate student and the Postgraduate student objects to the static students ArrayList;
f) to use a for loop to display all students' enrolment information in the students ArrayList. For each student, you shall display the student's personal information first, and then all enrolment records of the student. The Undergraduate student shall have one enrolment record and the Postgraduate student shall have two enrolment records.
g) to use the "instanceof" and "down casting" in the for loop above to show the bachelor completion time for the Postgraduate student (calling the specific getBachelorCompletion() method defined in the Postgraduate class).

See the snapshots of an example for the program testing. Your program must have the exact same outputs for the same inputs. The user's inputs are highlighted by blue colour. The watermark is used to prevent my snapshots are used in your reports. You must capture the snapshots of your own program's outputs and compilation.

```
(Enrol the first student to the Bachelor of Computer Science course)
Welcome to enrol the Bachelor of Computer Science course.
The course structure is as follows:
-----------------
Course: Bachelor of Computer Science

Cores:
CSIT111 (Programming Fundamentals, 6pt)
CSIT113 (Problem Solving, 6pt)
CSIT114 (System Analysis, 6pt)
CSIT115 (Data Management and Security, 6pt)
CSIT121 (Object Oriented Design and Programming, 6pt)
CSIT127 (Networks and Communications, 6pt)
CSIT128 (Introduction to Web Technology, 6pt)
CSCI235 (Database Systems, 6pt)
CSCI251 (Advanced Programming, 6pt)
CSIT214 (IT Project Management, 6pt)
MATH221 (Mathematics for Computer Science, 6pt)
CSCI203 (Algorithms and Data Structures, 6pt)
CSIT226 (Human Computer Interaction, 6pt)
CSIT314 (Software Development Methodologies, 6pt)
CSIT321 (Project, 12pt)

Big Data Major
CSCI317 (Database Performance Tuning, 6pt)
INFO411 (Data Mining and Knowledge Discovery, 6pt)
CSCI316 (Big Data Mining Techniques and Implementation, 6pt)
ISIT312 (Big Data Management, 6pt)

Cyber Security Major
CSCI301 (Contemporary Topics in Security, 6pt)
CSCI262 (System Security, 6pt)
CSCI369 (Ethical Hacking, 6pt)
CSIT302 (Cybersecurity, 6pt)

Digital System Security Major
CSCI361 (Cryptography and Secure Applications, 6pt)
CSCI262 (System Security, 6pt)
CSCI368 (Network Security, 6pt)
CSCI376 (Multicore and GPU Programming, 6pt)

Game and Mobile Development Major
CSCI236 (3D Modelling and Animation, 6pt)
CSCI336 (Interactive Computer Graphics, 6pt)
CSCI366 (Mobile Multimedia, 6pt)
CSCI356 (Game Engine Essentials, 6pt)
CSCI376 (Multicore and GPU Programming, 6pt)

Software Engineering Major
CSCI334 (Software Design, 6pt)
ISIT219 (Knowledge and Information Engineering, 6pt)
CSCI318 (Software Engineering Practices & Principles, 6pt)
ISIT315 (Semantic Web, 6pt)

Electives:
CSCI317 (Database Performance Tuning, 6pt)
INFO411 (Data Mining and Knowledge Discovery, 6pt)
CSCI316 (Big Data Mining Techniques and Implementation, 6pt)
ISIT312 (Big Data Management, 6pt)
CSCI301 (Contemporary Topics in Security, 6pt)
CSCI262 (System Security, 6pt)
CSCI369 (Ethical Hacking, 6pt)
CSIT302 (Cybersecurity, 6pt)
CSCI361 (Cryptography and Secure Applications, 6pt)
CSCI368 (Network Security, 6pt)
CSCI376 (Multicore and GPU Programming, 6pt)
CSCI236 (3D Modelling and Animation, 6pt)
CSCI336 (Interactive Computer Graphics, 6pt)
CSCI366 (Mobile Multimedia, 6pt)
CSCI356 (Game Engine Essentials, 6pt)
CSCI334 (Software Design, 6pt)
ISIT219 (Knowledge and Information Engineering, 6pt)
CSCI318 (Software Engineering Practices & Principles, 6pt)
ISIT315 (Semantic Web, 6pt)
-----------------

Please input your personal information to complete the enrolment.
Please input your full name: Bob
Please input your student number: 100001
Please input your gender: Male
Please input your date of birth (dd/mm/yyyy): 11/11/2000

Thanks for your information, we had enrolled you into the Bachelor of Computer Science course.
In order to complete the enrolment, please select a major from the list.
1: Big Data
2: Cyber Security
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3: Digital System Security
4: Game and Mobile Development
5: Software Engineering

Please input the index number before the major:1

You select the Big Data major.
Big Data Major
CSCI317 (Database Performance Tuning, 6pt)
INFO411 (Data Mining and Knowledge Discovery, 6pt)
CSCI316 (Big Data Mining Techniques and Implementation, 6pt)
ISIT312 (Big Data Management, 6pt)

In order to complete the enrolment, please select selective subjects from the list.

Electives:
CSCI317 (Database Performance Tuning, 6pt)
INFO411 (Data Mining and Knowledge Discovery, 6pt)
CSCI316 (Big Data Mining Techniques and Implementation, 6pt)
ISIT312 (Big Data Management, 6pt)
CSCI301 (Contemporary Topics in Security, 6pt)
CSCI262 (System Security, 6pt)
CSCI369 (Ethical Hacking, 6pt)
CSIT302 (Cybersecurity, 6pt)
CSCI361 (Cryptography and Secure Applications, 6pt)
CSCI368 (Network Security, 6pt)
CSCI376 (Multicore and GPU Programming, 6pt)
CSCI236 (3D Modelling and Animation, 6pt)
CSCI336 (Interactive Computer Graphics, 6pt)
CSCI366 (Mobile Multimedia, 6pt)
CSCI356 (Game Engine Essentials, 6pt)
CSCI334 (Software Design, 6pt)
ISIT219 (Knowledge and Information Engineering, 6pt)
CSCI318 (Software Engineering Practices & Principles, 6pt)
ISIT315 (Semantic Web, 6pt)

Please select 4 more elective subjects by inputting the subject codes (separate by
comma):CSCI334,ISIT219,CSCI318,ISIT315

Congratulations. You had completed the enrolment to Bachelor of Computer Science.

(Enrol the second student to the Master of Computer Science course, and add his/her Bachelor of Computer Science
record.)
Welcome to enrol the Master of Computer Science course.
The course structure is as follows:
-----------------
Course: Master of Computer Science

Cores:
CSCI814 (IT Project Management, 6pt)
CSCI851 (Advanced Programming, 6pt)
CSCI803 (Algorithms and Data Structures, 6pt)
CSCI835 (Database Systems, 6pt)
MTS9302 (Corporate Network Management, 6pt)
CSIT940 (Research Methodology, 6pt)
CSCI920 (Contemporary Topics in Computer Science, 6pt)
CSCI992 (Professional Project, 12pt)

Intelligent System Major
CSCI964 (Computational Intelligence, 6pt)
CSCI924 (Reasoning and Learning, 6pt)
CSCI944 (Perception and Planning, 6pt)

Machine Learning and Big Data Major
CSCI933 (Machine Learning Algorithms and Applications, 6pt)
CSCI935 (Computer Vision Algorithms and Systems, 6pt)
CSCI946 (Big Data Analytics, 6pt)

Network and Information Security Major
CSCI968 (Advanced Network Security, 6pt)
INFO912 (Mathematics for Cryptography, 6pt)
CSCI971 (Advanced Computer Security, 6pt)

Software Engineering Major
CSCI910 (Software Requirements, Specifications and Formal Methods, 6pt)
CSCI926 (Software Testing and Analysis, 6pt)
CSCI927 (Service-Oriented Software Engineering, 6pt)

Electives:
CSCI862 (System Security, 6pt)
CSIT826 (Human Computer Interaction, 6pt)
ISIT925 (Strategic Network Design, 6pt)
CSCI964 (Computational Intelligence, 6pt)
CSCI924 (Reasoning and Learning, 6pt)
CSCI944 (Perception and Planning, 6pt)
CSCI933 (Machine Learning Algorithms and Applications, 6pt)
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CSCI935 (Computer Vision Algorithms and Systems, 6pt)
CSCI946 (Big Data Analytics, 6pt)
CSCI968 (Advanced Network Security, 6pt)
INFO912 (Mathematics for Cryptography, 6pt)
CSCI971 (Advanced Computer Security, 6pt)
CSCI910 (Software Requirements, Specifications and Formal Methods, 6pt)
CSCI926 (Software Testing and Analysis, 6pt)
CSCI927 (Service-Oriented Software Engineering, 6pt)
ECTE903 (Image and Video Processing, 6pt)
INFO911 (Data Mining and Knowledge Discovery, 6pt)
INFO913 (Information Theory, 6pt)
-----------------

Please input your personal information to complete the enrolment.
Please input your full name: Amy
Please input your student number: 100002
Please input your gender: Female
Please input your date of birth (dd/mm/yyyy): 22/12/1998
Please input the time (Session/Year) you received your bachelor degree: Autumn/2020
(It is assumed that Amy completed Bachelor of Computer Science with the exact same subjects as Bob.
A same BCS record is added to Amy's enrolment record automatically.)

Thanks for your information, we had enrolled you into the Master of Computer Science course.
In order to complete the enrolment, please select a major from the list.
1: Intelligent System
2: Machine Learning and Big Data
3: Network and Information Security
4: Software Engineering

Please input the index number before the major:1

You select the Intelligent System major.
Intelligent System Major
CSCI964 (Computational Intelligence, 6pt)
CSCI924 (Reasoning and Learning, 6pt)
CSCI944 (Perception and Planning, 6pt)

In order to complete the enrolment, please select selective subjects from the list.

Electives:
CSCI862 (System Security, 6pt)
CSIT826 (Human Computer Interaction, 6pt)
ISIT925 (Strategic Network Design, 6pt)
CSCI964 (Computational Intelligence, 6pt)
CSCI924 (Reasoning and Learning, 6pt)
CSCI944 (Perception and Planning, 6pt)
CSCI933 (Machine Learning Algorithms and Applications, 6pt)
CSCI935 (Computer Vision Algorithms and Systems, 6pt)
CSCI946 (Big Data Analytics, 6pt)
CSCI968 (Advanced Network Security, 6pt)
INFO912 (Mathematics for Cryptography, 6pt)
CSCI971 (Advanced Computer Security, 6pt)
CSCI910 (Software Requirements, Specifications and Formal Methods, 6pt)
CSCI926 (Software Testing and Analysis, 6pt)
CSCI927 (Service-Oriented Software Engineering, 6pt)
ECTE903 (Image and Video Processing, 6pt)
INFO911 (Data Mining and Knowledge Discovery, 6pt)
INFO913 (Information Theory, 6pt)

Please select 4 more elective subjects by inputting the subject codes (separate by
comma):CSCI927,ECTE903,INFO911,INFO913

Congratulations. You had completed the enrolment to Master of Computer Science.

The enrolment records of the students are as follows:

----------------
Student: Bob (100001, Male, 11/11/2000)

Course Name: Bachelor of Computer Science    (ACTIVE)

Cores:
CSIT111 (Programming Fundamentals, 6pt)
CSIT113 (Problem Solving, 6pt)
CSIT114 (System Analysis, 6pt)
CSIT115 (Data Management and Security, 6pt)
CSIT121 (Object Oriented Design and Programming, 6pt)
CSIT127 (Networks and Communications, 6pt)
CSIT128 (Introduction to Web Technology, 6pt)
CSCI235 (Database Systems, 6pt)
CSCI251 (Advanced Programming, 6pt)
CSIT214 (IT Project Management, 6pt)
MATH221 (Mathematics for Computer Science, 6pt)
CSCI203 (Algorithms and Data Structures, 6pt)
CSIT226 (Human Computer Interaction, 6pt)
CSIT314 (Software Development Methodologies, 6pt)
```

```
CSIT321 (Project, 12pt)

Big Data Major
CSCI317 (Database Performance Tuning, 6pt)
INFO411 (Data Mining and Knowledge Discovery, 6pt)
CSCI316 (Big Data Mining Techniques and Implementation, 6pt)
ISIT312 (Big Data Management, 6pt)

Electives:
CSCI334 (Software Design, 6pt)
ISIT219 (Knowledge and Information Engineering, 6pt)
CSCI318 (Software Engineering Practices & Principles, 6pt)
ISIT315 (Semantic Web, 6pt)
Total Enrolled Credit: 144pt

Expected Bachelor Graduation: Autumn/2022
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Student: Amy (100002, Female, 22/12/1998)

Course Name: Bachelor of Computer Science    (COMPLETE)

Cores:
CSIT111 (Programming Fundamentals, 6pt)
CSIT113 (Problem Solving, 6pt)
CSIT114 (System Analysis, 6pt)
CSIT115 (Data Management and Security, 6pt)
CSIT121 (Object Oriented Design and Programming, 6pt)
CSIT127 (Networks and Communications, 6pt)
CSIT128 (Introduction to Web Technology, 6pt)
CSCI235 (Database Systems, 6pt)
CSCI251 (Advanced Programming, 6pt)
CSIT214 (IT Project Management, 6pt)
MATH221 (Mathematics for Computer Science, 6pt)
CSCI203 (Algorithms and Data Structures, 6pt)
CSIT226 (Human Computer Interaction, 6pt)
CSIT314 (Software Development Methodologies, 6pt)
CSIT321 (Project, 12pt)

Big Data Major
CSCI317 (Database Performance Tuning, 6pt)
INFO411 (Data Mining and Knowledge Discovery, 6pt)
CSCI316 (Big Data Mining Techniques and Implementation, 6pt)
ISIT312 (Big Data Management, 6pt)

Electives:
CSCI334 (Software Design, 6pt)
ISIT219 (Knowledge and Information Engineering, 6pt)
CSCI318 (Software Engineering Practices & Principles, 6pt)
ISIT315 (Semantic Web, 6pt)
Total Enrolled Credit: 144pt


Course Name: Master of Computer Science      (ACTIVE)

Cores:
CSCI814 (IT Project Management, 6pt)
CSCI851 (Advanced Programming, 6pt)
CSCI803 (Algorithms and Data Structures, 6pt)
CSCI835 (Database Systems, 6pt)
MTS9302 (Corporate Network Management, 6pt)
CSIT940 (Research Methodology, 6pt)
CSCI920 (Contemporary Topics in Computer Science, 6pt)
CSCI992 (Professional Project, 12pt)

Intelligent System Major
CSCI964 (Computational Intelligence, 6pt)
CSCI924 (Reasoning and Learning, 6pt)
CSCI944 (Perception and Planning, 6pt)

Electives:
CSCI927 (Service-Oriented Software Engineering, 6pt)
ECTE903 (Image and Video Processing, 6pt)
INFO911 (Data Mining and Knowledge Discovery, 6pt)
INFO913 (Information Theory, 6pt)
Total Enrolled Credit: 96pt


Expected Master Graduation: Spring/2022

Bachelor was received: Autumn/2020
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Tasks (10 marks)

Task 1 (7 marks): Implement the system according to the given UML class diagrams. If you add new classes, fields or methods in the UML class diagrams, please also include the new diagram in your submission. The program shall

- be consistent with the UML class diagrams;
- follow the conventions for naming all classes, variables, and methods;
- provide sufficient comments;
- use proper blank spaces, indentation and braces to make your code easy to read and understand;
- follow the steps specified in StudentSystem class to enrol two students into the Bachelor of Computer Science course and Master of Computer Science course, respectively;
- be able to automatically calculate the remaining elective subject number for the minimal credit points requirement;
- implement the Cloneable (deep clone) and Enrolment interface;
- implement abstract super class and abstract methods;
- override abstract methods in sub class with polymorphism;
- use the instanceof and down casting to cast a super class object to a sub class object for calling the specific methods defined in the sub class.

Task 2 (3 marks): Compilation and test. You should compile and test your program by using two different cases. The first testing case must use the exact same inputs in the given example. The second testing case must choose different majors and elective subjects for the two students. Please carefully compile and test your program and make sure your program can pass the compilation by using "javac" command. Please do not define the package in your program (a special alert for students who use IDE to complete the assignment).

Submission:

- Please submit your solution to Moodle (Assignment 2). Email submission is not accepted.
- Please submit an **individual PDF document (StudentSystem.pdf)** and **a Java program** (**StudentSystem.java).**
- The StudentSystem.java is your solution for Task 1, and it shall **contain all classes** of the system. The Java program's name must be **StudentSystem.java**.
- The PDF document shall contain your solutions for Task 2. Please also include the UML class diagrams if you did any modification in the PDF document. Please include the snapshots to clearly shows the compilation and the execution of your program with the two testing cases.

NOTES:

Enquiries about the marks can only be made within a maximum of 1 week after the assignment results are published. After 1 week the marks cannot be changed.

Mark deductions: compilation errors, incorrect result, program is not up to spec, poor comments, poor indentation, meaningless identifiers, required numeric constants are not defined, the program uses approaches which has not been covered in the lectures. The deductions here are merely a guide. Marks may also be deducted for other mistakes and poor practices.