INFO-C 210 (Problem Solving and Programming I)

Instructor Contact Information

Instructor: Dr. Awny Alnusair - http://www.indiana.edu/~awny/

Contact: *Canvas e-mail is my preferred means of contact. I will return your e-mails within 24 hours. Although I prefer Canvas Messages, you can email me alnusair@iu.edu*

Phone: 765-455-9394

Office: Kokomo Campus - Hunt Hall - SM 206F

Online Office Hours: Tuesdays and Thursdays 11:30 am – 1:00 pm EST or by appointment. We can meet online via Zoom. This is the URL for my Room in Zoom: https://iu.zoom.us/j/2852177670. If you show up and for some reason I don't notice you showing up in the online office, you may need to notify me via an email.

Prerequisites

INFO-C112. If you have not taken C112, you must have a very good background in Java programming or otherwise you may not be able to succeed in this course. If you are in doubt about your background, make sure to contact me immediately.

Course Description

First in a two-course sequence of intensive computer programming. In this course, students will design, develop, test, and debug software solutions using the Java programming language.

Course Website

You will participate in this course using the IU Canvas learning management platform system. Once you are in the platform you can learn how to use Canvas effectively, by clicking the "Help" link on the top right of the course page on Canvas.

https://iu.instructure.com/courses/1841444

Learning Outcomes

After taking the course, students will be able to:

- Apply the fundamental software coding structures as sequential, decision and repetition structures
- Demonstrate the ability to design, implement, debug, and test software applications using a given programming language
- Utilize problem solving and creative thinking skills to create software and resolve errors
- Apply problem solving techniques to solving basic algorithms

- Applying best programming practices and techniques
- Demonstrate the skills, behaviors and attitudes necessary to function as an effective team member

Program Learning Outcomes

This course satisfies the following joint online informatics degree program goals:

- Demonstrate knowledge in number system (basic info representation: Binary, Octal, Hex)
- Demonstrate basic problem solving (for example pseudocoding, flow charting) techniques
- Utilize low level representation of data (bit, byte, int, float, char, unicode, string, audio, video, image)
- Demonstrate basic programming skills (including: variables, conditionals, loops, sub programs, and parameter passing)
- Demonstrate proficiency in at least one programming language
- Demonstrate the ability to design, implement, test, and debug structured and object-oriented programs
- Demonstrate the ability to discuss and/or construct memory based structures and algorithms (Arrays (single, multidimensional), Lists (single, double, circular), stacks, queues, binary trees) – very basic introductions
- Demonstrate the ability to identify elements of proper interface design, and ability to build user-centered interfaces. (HCI)
- Demonstrate proficiency of contemporary technological tools for communication and collaboration
- Effectively utilize oral, written, and visual communications of both qualitative and quantitative information within the context of a team
- Identify and demonstrate the skills, behaviors and attitudes necessary to function as an effective team member
- Articulate legal and ethical issues when using the creative work of others; respect the intellectual property of others

Course Requirements

The following is the required textbook. From time to time, other reference materials and handouts will be used to cover topics that are not present in the textbook.

- Y. Daniel Liang. "Introduction to Java Programming, brief Version", 11th Edition. Pearson. ISBN-13: 9780134611037. (2018)
  Textbook note: I will be teaching this class with **IU eTexts**. Your copy is available in your Canvas class page. In the Canvas menu at the left of the screen, click on "IU eTexts (Unizin Engage)" to open the reading platform. Unizin Engage works best when viewed in Chrome or Firefox.

Recommended Text

- Deitel & Deitel, *Java How to Program (Early Objects)*, 11th edition, 2018, Pearson. ISBN: 0-13-474335-0

Technical Requirements

You will need the following in order to participate in this course:

- Computer;
- Reliable internet connection;
- Computer microphone;
- Some way to make and post a simple video (e.g., using a webcam, or a smart phone);
- Open Canvas in a browser such as Chrome or Firefox

Technical Support

You may also receive support from

- University Information Technology Services (UITS) (human support)
- IU Knowledge Base (IUKB) (guides)
- IUware (download free software)

Software Requirements

Java™

You are required to have access to a computer with the Java Software Development Kit (JDK 8 or JDK 9) installed. The software can be downloaded from the Java website: http://www.oracle.com/technetwork/java/javase/downloads/index.html

Integrated Development Environment (IDE)

You can use any text editor to edit your programs. Below are some simple and free Java editors that are available:

- TextPad (http://www.textpad.com/ A very simple Java editor
- JCreator: (http://www.jcreator.com/ A simple Java editor
- EditPlus: (http://www.editplus.com/ A simple Java editor
- BlueJ: (http://www.bluej.org/ A great learning tool.
- JEdit: (http://www.jedit.org/ A great Java editor for serious Java programmers

However, since you will be doing serious Java programming in this course, you should invest the time in learning an Integrated Development Environment (IDE). I am particularly fond of **Eclipse** (http://www.eclipse.org/) and I highly recommend it for this class and your future development practices. It takes a little time to figure out how to use it. However, once you get used to it, you will certainly appreciate what this IDE has to offer. In this course, all my demonstrations will be using Eclipse. However, if you are familiar with another IDE such as NetBeans, feel free to use that IDE instead.

Teaching and Learning Notes

This course will be taught entirely online. There are no planned face-to-face meetings. The course is delivered in Canvas and organized in a modular format. Your reading and work assignments can be found in the Canvas's Modules tool. I designed this course using several modules, each lasting a week or two. Please come to Modules to see your learning activities and what to do each week

I recommend working online in Canvas several times a week for this course. This way you spread out the work more evenly and give you thinking and reflection time about what you have learned. You, however, know your own schedules, and you may decide that one primary longer work period is your own best or only option. We will strive to create a community. This will work best in an environment of trust where we can have discussions about struggles and triumphs. I hope you will see each other as co-explorers and give each other feedback when you can.

One of the goals of this course is for you to learn how to do things mostly on your own; professionals need to figure out something in the workplace, they usually have to learn it on their own. I'm here to help when you have trouble and need extra help. You can learn to do things by looking in your textbook, looking at other books, using online videos, and by searching YouTube or the rest of the web. I care about you learning what you need to learn more than I do what method you use. You can use more videos and books than the ones I suggest—there is a lot of material out there.

This class treats you like an adult who can take charge of his or her own learning. To be blunt, you'll get as much or as little out of this class as you put into it.

Grading Policies

All the assignments that you will need to turn in online are listed in Grades. I use Grades for you and me to track whether assigned work is complete or not yet complete. If the assignment is done within Assignments, look for feedback in that specific assignment; the feedback will appear as posts in the comments section, which will allow you to post back a comment about your grade if needed. If the assignment is in Discussions, it may receive feedback from either your colleagues or from me. I often allow time for classmates to respond first. If the assignment is Discussion used as a blog entry, I will sometimes post a comment after your blog. I do read all your entries.

Item	% Value
Discussions in Forums	10%
Assignments	25%
Quizzes	25%

Midterm & Final Exams	20%
Group Project	20%

Grading Scale

Letter grades will be determined as outlined below:

Note: If you are on track for a D, you are failing the course.

Grade	% Range	Points Range
A	94-100	442-470
A-	90-93	423-441
B+	87-89	409-422
B	84-86	395-408
B-	80-83	376-394
C+	77-79	362-375
C	74-76	348-361
C-	70-73	329-347
D+	67-69	315-328
D	64-66	301-314
D-	60-63	282-300
F	<60%	Less than 282

Course Outline

This course is organized into the following major learning modules:

Module 0: Course Introduction

1. Review of Java Programming Fundamentals (2weeks)
2. Multidimensional Arrays (1 week)
3. Object Oriented Programming with Objects and Classes (3 weeks)
4. Inheritance and Polymorphism (3 weeks, including Fall Break week)
5. Exception Handling (2 weeks)
6. Abstract Classes and Interfaces (2 weeks)
7. Creating Rich Client Applications with the JavaFX API (2 weeks)
8. Binary I/O (1 week)

Module / Date	Module Learning Outcomes / Goals	Textbook Reading Assignment
Module 0 **&** **Module 1** **Starts on August 26**	• Develop understanding of proper programming practices and techniques • Practice elementary Java programming (variables, operators, input and output) • Practice programming logic structures (sequential, decision, and looping) • Practice the use of Java Methods • Practice the use of single dimensional arrays	• Read Chapters 1 through 7 in *Introduction to Java Programming, brief version, 11th edition* • Read all of the Canvas pages for this module, including step-by-step guide covering require resources
Module 2 **Starts on Sep 9**	• Declare and process two-dimensional and multidimensional arrays • Pass two-dimensional and multidimensional arrays to methods • Use multidimensional arrays in applications	• Read Chapter 8 in in *Introduction to Java Programming, brief version, 11th edition* • Read all of the Canvas pages for this module, including step-by-step guide covering require resources
Module 3 **Starts on Sep 16**	• Explain fundamental object-oriented programming concepts and features • Articulate class abstraction and encapsulation • Define classes and construct objects • Build UML diagrams that show class relationships • Use visibility modifiers properly • Create arrays of objects and pass those to methods • Create programs that define aggregation and composition relationships • Convert primitive types into objects and vice versa using the Java Wrapper classes	• Read Chapters 9 through 10 in *Introduction to Java Programming, brief version, 11th edition* • Read all of the Canvas pages for this module, including step-by-step guide covering require resources
Module 4 **Starts on Oct 7**	• Define and code inheritance relationships between super-classes and sub-classes • Override methods in sub-classes • Utilize protected members in classes	• Read Chapter 11 in *Introduction to Java Programming, brief version, 11th edition* • Read all of the Canvas pages for this module, including step-

Module / Date	Module Learning Outcomes / Goals	Textbook Reading Assignment
	• Utilize Polymorphic processing, *instanceof* operator, and Downcasting • Identify different kinds of Polymorphism: parameter coercion, parametric polymorphism, sub-type polymorphism, and ad-hoc polymorphism • Design and build Java applications using advanced object-oriented features such as information hiding, inheritance, and polymorphism • Utilize the *ArrayList* library class	by-step guide covering require resources
Module 5 **Starts on Oct 28**	• Demonstrate understanding of the Java exception handling and Java exception hierarchy • Code different kinds of exception types in java programs • Utilize chained exceptions • Understand the difference between checked and unchecked exceptions • Define custom exception classes • **Midterm Exam**	• Read Chapter 12 in *Introduction to Java Programming, brief version, 11th edition* • Read all of the Canvas pages for this module, including step-by-step guide covering require resources
Module 6 **Starts on Nov 11**	• Demonstrate understanding of Java Interface development techniques • Articulate the need for using Interfaces and their benefits • Develop understanding of Interfaces and Abstract classes • Practice creating programs with special library interfaces such as Comparable and *Cloneable* • Use Java Interfaces polymorphically	• Read Chapter 13 in *Introduction to Java Programming, brief version, 11th edition* • Read all of the Canvas pages for this module, including step-by-step guide covering require resources
Module 7 **Starts on Nov 25**	• Develop an understanding of the basic structure of JavaFX programs • Develop applications that utilize UI controls, components such as panes, and other GUI classes such as Color, Font, and Image • Develop GUI applications with objects such as Button, *RadioButton, CheckBox, Slider*, etc. • Design and implement graphical user interfaces (GUIs) using abstract object oriented GUI components.	• Read selected sections Chapters 14, 15, and 16 in *Introduction to Java Programming, brief version, 11th edition* • Read all of the Canvas pages for this module, including step-by-step guide covering require resources

Module / Date	Module Learning Outcomes / Goals	Textbook Reading Assignment
Module 8 **Starts on Dec 9**	• Utilize Java platform classes used for basic I/O • Demonstrate understanding of Text I/O and Binary I/O • create and manipulate sequential access text files • Utilize Object Serialization and Deserialization with the Serializable interface in Java • Serialize structures in java applications	• Read Chapter 17 in *Introduction to Java Programming, brief version, 11th edition* • Read all of the Canvas pages for this module, including step-by-step guide covering require resources

University Policies

Accommodations

Every attempt will be made to accommodate qualified students with disabilities (e.g. mental health, learning, chronic health, physical, hearing, vision neurological, etc.) You must have established your eligibility for support services through the appropriate office that services students with disabilities. Note that services are confidential, may take time to put into place and are not retroactive; Captions and alternate media for print materials may take three or more weeks to get produced. Please contact your campus office as soon as possible if accommodations are needed. Find your campus office serving students with disabilities.

Intellectual Dishonesty

All work should be your original product, unless explicitly noted otherwise. Any materials you reference or take from others should be properly cited. Cheating, plagiarism, or fabrication in any form will not be tolerated, regardless of any justification. For more detailed information see the Student Responsibilities section of the Code of Student Rights, Responsibilities, and Conduct. Academic misconduct will not be tolerated. The minimum consequence is failing the assignment. In a case of more serious offense, a student may fail the course. **Students should NOT present work from other courses in this class (i.e., using pieces of previous papers you have done is considered plagiarism).** I may use the services of Turnitin.com to check for originality of your written work.

Title IX Sexual Misconduct

As your instructor, one of my responsibilities is to help create a safe learning environment on our campus. Title IX and our own Sexual Misconduct policy prohibit sexual misconduct. If you have experienced sexual misconduct, or know someone who has, the University can help. I encourage you to visit Stop Sexual Violence website to learn more. If you are seeking help and

would like to speak to someone confidentially, you can make an appointment with a Mental Health Counselor on campus.

It is also important that you know that federal regulations and University policy require me to promptly convey any information about potential sexual misconduct known to me to our Deputy Title IX Coordinator or IU's Title IX Coordinator. In that event, they will work with a small number of others on campus to ensure that appropriate measures are taken and resources are made available to the student who may have been harmed. Protecting a student's privacy is of utmost concern, and all involved will only share information with those that need to know to ensure the University can respond and assist.

Code of Student Rights, Responsibilities, and Conduct

Students are expected to adhere to the Code of Student Rights, Responsibilities, and Conduct at all times. Any inappropriate behavior, disruptive conduct (e.g., engaging in hostile or disrespectful commentary on the site, or discussing irrelevant evidence) or non-compliance with faculty directions can result in a charge of Academic and/or Personal Misconduct, the consequence of which could be a variety of sanctions either from the instructor or the Dean of Students. For more information see The Code of Student Rights, Responsibilities, and Conduct.

Campus X Grading Policies

The following includes highlights paraphrased from several campus or university policies pertaining to grades and grading. For official descriptions of these and other related policies, click the Campus Course Policies button on your Canvas tool bar and then click the link for your specific Campus Academic Policies.

Grade Appeal

If you believe the grade received in a course is incorrect, you should follow the Grade Appeal Policy.

Dropping a Course

During the first week of classes you may drop a class with no grade recorded on your transcript. From the second week of classes through the ninth week (the 'auto W' period), you may withdraw from a class with an automatic grade of 'W'. This will be recorded on your transcript, but not included in your GPA.

After the ninth week (and before the final exam period), a student wishing to withdraw with a grade of 'W' must be passing the course at that time. You must complete a 'Drop Only' form and contact the offices listed for signatures before giving the form to the instructor. The instructor will confirm on the form that you are passing at that time for a 'W' grade or that your grade is an 'F'. This 'F' grade WILL be included in calculation of your GPA.

Faculty members are required to report any student who stops attending a class and does not withdraw (with a grade of 'W' or 'F'). Failure of a course due to non-attendance may affect financial aid award amounts.

Course Expectations

Classroom Civility

It is important to build a classroom climate that is welcoming and safe for everyone. Please display respect for everyone in the class. You should avoid racist, sexist, homophobic, or other negative language that may exclude members of our campus and classroom community.

Participation

You should be logging onto Canvas at least three times a week to view assignments, presentations, contribute to discussions, post questions, read posting of others, etc. Activities and assignments will be posted in advance providing ample time for completion. Please plan your schedules accordingly.

Course Participation and Absence Policies

This course is highly interactive and therefore active participation in discussion forums is required. The participation grade will depend on your willingness and ability to intelligently discuss the readings and to make points relevant to the discussion. Make sure to attend online several times a week. We will strive to create a community. This will work best in an environment of trust where we can have discussions about struggles and triumphs. I hope you will see each other as co-explorers and give each other feedback when you can.

If you plan to be absent from class activities for longer periods of time because of an unusual circumstances and extremely rare cases, please let me know and **complete your work in advance**. For a scheduled exam/quiz, forum, or other course events, arrange with me for earlier date. In case you miss these scheduled events, you will receive a zero.

Late Work

Late work will not be accepted in this course.

Plagiarism

Honesty requires that any ideas or materials taken from another source for either written or oral use must be fully acknowledged. Offering the work of someone else as one's own is plagiarism. The language or ideas thus taken from another may range from isolated formulas, sentences, or paragraphs to entire articles copied from books, periodicals, speeches, or the writings of other students. The offering of materials assembled or collected by others in the form of projects or collections without acknowledgment also is considered plagiarism. Any

student who fails to give credit for ideas or materials taken from another source is guilty of plagiarism.

(Faculty Council, May 2, 1961; University Faculty Council, March 11, 1975; Board of Trustees, July 11, 1975) Source comes from IU's Policies site.

According to the Indiana University Code of Student Rights, Responsibilities, and Conduct (2010), a student must give credit to the originality of others and acknowledge indebtedness whenever:

1. Directly quoting another person's actual words, whether oral or written;
2. Using another person's ideas, opinions, or theories;
3. Paraphrasing the words, ideas, opinions, or theories of others, whether oral or written;
4. Borrowing facts, statistics, or illustrative material; or
5. Offering materials assembled or collected by others in the form of projects or collections without acknowledgement.

Right of Revision

The instructor reserves the right to revise or adjust the course syllabus to best accommodate the pace and needs of the students.

Fair Use Policy

Copying or recording synchronous classes and asynchronous course materials without the express prior approval of Professor Awny Alnusair is prohibited. All copies and recordings remain the property of Indiana University and Professor Awny Alnusair. IU and Professor Awny Alnusair reserve the right to retrieve, inspect, or destroy the copies and recordings after their intended use. These policies are not intended to affect the rights of students with disabilities under applicable law or IU policies.

Assignments:

You are responsible for submitting all assignments when they are due. No late work will be accepted and extensions will not be granted. You are usually given more than enough time to complete the assignment, so take advantage of it. Failure to submit all major assignments will result in a failing grade in the class. If you don’t understand your grade on an assignment, contact me. I cannot stress this enough. If you have any questions, contact me so I can help you understand.

Invitation

I strive for this class to be as rewarding for you as possible. Throughout the semester, do not hesitate to contact me if you have any questions, suggestions, or concerns about this class. I

welcome your feedback about the class (content, pace, organization) and about any other aspect of my instruction (tests, grading, availability, etc.).