CS112: Introduction to Computer Programming (Fall 2021)
All Sections

1 Course Basics

Instructors

Professor	Email	Office	Section
Ana Gonzalez Hernandez	loreto	ENGR2707	001 (MW 12:00-1:15 pm) & 002 (MW 3:00-4:15 pm)
Shahnaz Kamberi	kamberis	ENGR2706	005 (TR 10:30-11:45 am) & 006 (TR 12:00-1:15 pm)
Ahmed Bin Zaman	azaman6	ENGR4455	003 (MW 1:30-2:45 pm) & 007 (MW 12:00-1:15 pm)

Course Outcomes:

- An ability to use procedural programming language concepts including expressions, decision statements, simple data types, Boolean logic, input/output, loop constructs, and procedures.
- An ability to combine programming techniques to solve problems of varying degrees of difficulty.
- An ability to refine computer programs through testing and debugging to ensure proper operation.
- An ability to read, understand, and evaluate a program specification to independently implement the desired behavior.
- An ability to understand issues and ethics related to obtaining and using code from unknown, unreliable, or unethical sources, as a precursor to best professional practices.

Mason Core IT Learning Outcomes:

- Students will understand the principles of information storage, exchange, security, and privacy and be aware of related ethical issues.
- Students will become critical consumers of digital information; they will be capable of selecting and evaluating appropriate, relevant, and trustworthy sources of information.
- Students can use appropriate information and computing technologies to organize and analyze information and use it to guide decision-making.
- Students will be able to choose and apply appropriate algorithmic methods to solve a problem.

Prerequisite

C or better in MATH 104, 105, or 113 (or sufficient score on the math placement test).

1.1 Textbook

Required - [zyBooks Online Textbook](#)

- Sign in or create an account at **learn.zybooks.com**
- Enter zyBook code: **GMUCS112Fall2021**
- Subscribe using any credit card. Discounted price for GMU students is **$52.20** (instead of $58). Be aware that the price at GMU Bookstore is higher.
- Students that **retake the course** contact **support@zybooks.com** to have the book added to your library for **free.**
- Students may begin subscribing to the textbook on Aug 09, 2021, and the cutoff to subscribe is Dec 01, 2021. Subscriptions will last until Dec 30, 2021.

Quite Optional - The Practice of Computing Using Python, Second Edition. William Punch and Richard Enbody. This is for students who want extra reading resources. You might be able to view a copy for free at Fenwick Library.

1.2 In-Class Participation

We will use online tools (e.g. Blackboard, [Piazza](#)) to interactively answer questions in class and get credit for the day.

1.3 [Piazza](#)

- Announcements, Discussion, GTA/UTA contacts and office hours will be on Piazza.
- All correspondence will go through Piazza. You can send private messages to the instructors (visible to all professors, GTAs, and UTAs) as well as post public questions visible to all students, collaborate on responses, and tag everything by topic.
- Unless you have a confidential matter to discuss directly with an individual professor/TA, please do not email us directly -- use a private piazza post. *Project help questions sent via email are of extremely low priority, as they were sent to the wrong place and will most likely be responded to with "please post on Piazza".*
- **The discussion board on Piazza is required reading for all programming assignments**. You MUST read the discussion board daily for clarifications and potential updates.

1.4 [Blackboard](#)

- Course schedule, course syllabus, description of assignments, lab and lecture slides and/or lecture videos will be posted on Blackboard.
- All programming assignments will be submitted (per published deadlines) via Blackboard.
- All grades will be posted to Blackboard.

2 Grading

Category	Points	Percent	Notes
Reading	----	5%	Make sure you are logged in to zyBooks to get credit for reading completion. Drop 2 lowest-completion assignments (not chapters!)
Labs	10 Points each/12 total 100 Points	10%	Drop 2 lowest, average others evenly
Programming Assignments	50 Points each/9 total 400 Points	40%	Drop 1 lowest
Tests			
Midterm 1	100 Points	10%	See section 2.4 on Exams
Midterm 2	100 Points	10%	See section 2.4 on Exams
Final Exam	250 points	25%	**Must pass final exam to pass the class.** See section 2.4 on Exams

Assessment

- A+ (>= 98.0%) A (>= 92.0%) A– (>= 90.0%)
- B+ (>= 88.0%) B (>= 82.0%) B– (>= 80.0%)
- C+ (>= 78.0%) C (>= 72.0%) C– (>= 70.0%)
- D (>= 60.0%)
- F (< 60.0%)
- There will be no make-up or extra-credit assignments at the end of the semester; your grade should be a measure of your semester-long progress.

2.1 Individual Programming Assignments

Programming assignments are a significant portion of your grade. You should not expect to be able to finish them in one sitting. Each one will take multiple sessions of coding, with questions asked along the way. This is the practice you need to learn, master, and internalize various concepts of the course. Don't be surprised if you're spending 5-20 hours on each one. Each assignment will have a different number of points based on the level of difficulty.

- **Blackboard Submission**

    Activities and assignments in this course will regularly use the Blackboard learning system, available at https://mymason.gmu.edu. *Students are required to have regular, reliable access to a computer with an updated operating system and a stable broadband Internet connection.*

    o All assignments are to be submitted to Gradescope/Blackboard. You can submit your work an unlimited number of times to Gradescope/Blackboard prior to the assignment deadline, and by default only the last version will be graded.

- Turning in the wrong files will likely result in a zero. You can and should download your submitted attempts to verify that you turned in a working copy.
- Blackboard being unavailable is not an excuse for turning in a late assignment; in the rare situation that the website is somehow unavailable or giving the student an error, the student MUST email their submission to their GTA before the deadline, otherwise it will be considered late.
- Catastrophic computer failure will not be cause for an extension. Use a backup service such as DropBox (or any cloud service), emailing yourself, storing to a USB drive, whatever it takes. Every semester multiple student's computers die, are stolen, or otherwise 'lose' their files. Don't be the student who forgot to (frequently) back up your work!

All course materials posted to Blackboard or other course sites are private to this class; by federal law, any materials that identify specific students (via their name, voice, or image) must not be shared with anyone not enrolled in this class.

- **Deadlines and Emergency-Days**

  - Each assignment has a posted deadline.
  - The latest you can turn in work is 24 hours after the posted deadline, no exceptions.
  - Each student gets **four** Emergency-Days (4 tokens), which are automatically used by turning in an assignment 24 hours late.
  - If you don't have any emergency-days left and submit late, your maximum score lowers by **20%** (not quite the same as a 20% penalty). So, in this case: recorded_grade = min(raw_score, 80).
  - Either you use emergency-days or pay the late-penalty, either way you should turn in work within 24 hours of the original deadline! This means you **can't** use more than one emergency-days or pay multiple late penalties on a single assignment.
  - Turning in 1 minute late and turning in 23 hours and 59 minutes late are treated the same (and therefore there are no "half emergency-days" and no "partial late penalties").
  - Unused emergency-days will be worth a small bounty at the semester's end (0.25% of the semester grade). This is a reward (1% if you don't spend any of them) for working and planning ahead during the semester.

- **Broken Code == Bad Scores**
  - After the first two programming assignments, any code turned in that does not run (immediately crashes due to errors), specifically on Python 3.9, will receive at most 50%. **No exceptions.** At this point, if the grader can quickly fix your code, you might get some points back. If the grader cannot immediately spot and fix the issue, you might not get any points at all.
  - Turning in code that runs is a big deal!

- **Honor Code: Special Notes for Programming Assignments**
  - Programming assignments are considered individual efforts, therefore no sharing of code and/or discussion of problem solutions are allowed with anyone except the TAs or the professors. Student submissions will be manually and automatically assessed for cheating. **You may not look at or otherwise view or discuss any other individual's code, pseudocode, or algorithms.**
  - You may not use any Internet resources to create code or algorithms, besides the textbooks, the slides, and Piazza, unless otherwise specified. However, you are free to look up the syntax errors you encounter online, to gain an understanding of what the

syntax error means. The assignments we're doing this semester can be directly solved using techniques discussed in class, and no outside material is needed unless otherwise noted.

- o **It is your responsibility** to lock your computers with a password, to not post your code to websites like Pastebin that are publicly accessible, to guard your USB drives and computers, to not upload your files to someone else's computer, etc. You are liable for any access gained to your code.
- o See Honor code section below for more details.

2.2 Labs

- All lab assignment grades will be averaged together. Lab assignments will be weekly quizzes or lab tasks.
- Lab tasks require attendance at your *designated* lab time to get the credit.
- Any missed lab assignment is simply missed, regardless of the reason why (travel, illness, work, traffic, receiving a major award, getting married, saving the universe, etc.). Two lowest lab grades will be dropped to cover the very rare cases of understandable missed labs.
- If you choose to miss some labs early on for no reason, and later, must miss for some understandable reason, you would have used up your two drops unnecessarily. Try to save the drops so you can throw out a bad grade, and not just hide a lazy zero. Pretending you don't have these available drops is your best approach.

2.3 e-book Readings

- zyBook readings are graded based on the completion percentage of activities **before the designated deadline** of each chapter.
- See the schedule page on Piazza for reading assignment due date.
- Make sure you're logged in to get credit for reading completion.
- Optional subsections are not considered for zyBook reading.

2.4 Exams

- Exams are closed book/notes unless specified otherwise by instructor.
- The final exam is cumulative. If you perform better on the final exam than your midterm exams, we will replace the midterm grade(s) (one or both) with the final grade.
- If you know in advance that you are unable to take an exam by the deadline posted for a valid and unavoidable reason (such as a scheduled surgery, etc.), you must notify the professor at least one week before the scheduled exam date to make arrangements for a make-up.
- If you miss an exam deadline due to a university-accepted excused absence (such as an illness or car accident the day and time of the exam), you must notify your professor within 24 hours of your absence to make arrangements for a makeup. Failure to follow either of these policies will result in a zero on the exam.
- Per departmental policy, you must pass a significant exam threshold to receive a passing grade in this class, regardless of your performance on other assignments. Failing the final exam (<60.0%), will result in a failing grade (F) for the entire course unless you have achieved an average exam score >=65%. This average score is calculated as a **weighted** average of your exam scores $(((10*\text{Labs}) + (20*\text{Midterms}) + (25*\text{Final}))/55)$. Note that midterm grades will not be "replaced" with the final grade for this calculation. In short, in 99/100 cases, **you must pass the final exam to pass the course.**

2.5 Contested Grades

- If you feel points have been incorrectly deducted, contact the grader. For all homework assignments and lab work, that is your GTA. For exams, that is your professor. Contesting of grades on any/all submissions must be requested within one week of receiving the grade (on Blackboard or Gradescope). No grade changes will be considered after that deadline.

3 Office Hours and Discussion Board

There is substantial support available to you outside of lecture time in the form of office hours and the online discussion board (Piazza). If you are having difficulty on a programming assignment or lab, we encourage you to reach out **as early as possible**. That said, to ensure fairness and facilitate learning, we have some basic rules for seeking help outlined below. Please note that Piazza is a discussion forum for you, the students, to discuss the course and the course material. There will be UTAs assigned to check on this forum regularly and try to moderate the discussion, but this is NOT a replacement for office hours, lecture with your professor, or labs.

3.1 Rules for Office Hours

- Students must use their Mason email account to receive important University information, including communications related to this class.
- We will not respond to messages sent from or send messages to a non-Mason email address. Please indicate your name and what course you are referring to in your email.
- Please give 48 hours (usually 24 hours or less) for faculty to respond to email on weekdays. Emails sent on the weekend will be responded to on the following Monday.
- For students seeking help with programming assignments during office hours, students must identify the line number, through debug print statements, where they believe an error to be before seeing the TA or instructor. This implies that you must have at least one test case that fails to bring to office hours before the TAs or instructor can help you.
- For more general programming assignment questions, students must bring their own pseudocode to office hours before the TA or professor can help you.
- Under no circumstances will the professor or GTA reveal more than three lines of code at a time during office hours. Students must make significant individual effort on all programming assignments before coming to see a GTA/professor. **Waiting until the last minute, in the expectations that the entire programming assignment will be explained in one office hours session, is not feasible.**
- Office hours are often crowded - do not rely on them for last minute help, as we cannot guarantee that we will be able to spend significant time with every student.
- If you have any questions about what you are/aren't permitted to do on a programming assignment or lab, and you and the TA cannot find the answer written somewhere, you should ask your professor. **"So-and-so said" will not be an accepted as a reason for grade re-evaluations** (unless "so-and-so" is your professor).

3.2 Rules for the Discussion Board

- Students are encouraged to use the discussion board, Piazza, to ask and answer questions about assignments, labs, course material, etc.
- No sharing answers or code solutions to assignments on the discussion board. See [Honor code](#) section below for more details.
- Students can post questions and code privately, although the instructor reserves the right to make any post public, so that other students can see the responses.

- For students wishing to post their code privately to Piazza, the same rules apply as when coming to office hours; if you have code written, you must produce at least one failing test case where you have identified what line number is giving you problems.
- UTAs will be assigned to moderate the student discussion, help review student answers, answer private questions, and address questions which have not received a student answer. Therefore, responses to questions can be expected **within 24 hours**, though often much sooner.
- Statements made on the discussion boards, even by TAs and especially by other students, should NOT be considered the definitive word on the subject unless it is verified by your professor (in the assignment description, in class, posted on Piazza, etc.). The UTAs can flag professors if/when clarifications are needed.
- If you have any questions about what you are/aren't permitted to do on a programming assignment or exam, and you/others cannot find the answer written somewhere, you should ask your professor. **"So-and-so said" will not be an accepted as a reason for grade re-evaluations** (unless "so-and-so" is your professor).

4 Honor Code

- The honor code at George Mason is an important part of our academic culture. A degree from this institution should be a direct measure of your own progress and abilities, and as such, at all times we must ensure that all work that should be your own is your own.
- All students are expected to abide by the GMU Honor Code. This policy is rigorously enforced.
- The computer science department has an CS Honor Code Policies to understand better what constitutes cheating in the CS setting. It clarifies some scenarios that are unique to our sort of assignments. Note that the CS department doesn't have any "extra" policy for the honor code on top of the university's, this document merely helps you to understand how the honor code applies to programming and CS, but it doesn't restrict it at all.
- We take the honor code quite seriously. Any attempts at copying or sharing code, algorithms, or other violations of the honor code simply will not be tolerated. Cheating will be prosecuted and result in a notification of the Honor Committee as outlined in the GMU Honor Code. **Sharing, collaboration, or looking at any code or algorithm related to programming assignments that is not your own is considered cheating. This includes using code found on the internet.**
- As seductively simple as it may seem to just copy and paste work from a friend, or even to just work on the assignment on your own machines next to each other, remember that it is just as easy to compare your work automatically and electronically, and discover the similarities in text and structure. We use automated software to flag suspicious cases, and then review them to find the cases that must be submitted to the Office of Academic Integrity.
- **Confirmed cases of cheating result in a final grade of an F in the course.**
- Please read Understanding the Honor Code - Dr. Snyder's thoughts about the purpose of the honor code in a computer science course.
- Sharing of instructor-created materials, particularly materials relevant to assignments or exams, to public online "study" sites is considered a violation of Mason's Honor Code. For more information, see the Office of Academic Integrity's summary of information about online study sites.
- There are opportunities to study, work, and learn together throughout this course - zybook questions, lab exercises, and more. Mostly you will need to work independently for any sort of "test" and for homework assignments.

5 University Policies

- There is a limit of two graded attempts for this course. A W does not count as a graded attempt. Please see the University Catalog and consult with your academic advisor if you have any questions.
- Gender Identity and Pronoun Use: if you wish, please share your name and gender pronouns with us and how best to address you in class and via email. You can update your chosen name and pronouns here.
- Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first visit http://ds.gmu.edu/for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. It is your responsibility to email your accommodation letter to your professor. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email:ods@gmu.edu | Phone: (703) 993-2474.
- George Mason University, an intentionally inclusive community, promotes and maintains an equitable and just work and learning environment. We welcome and value individuals and their differences including race, economic status, gender expression and identity, sex, sexual orientation, ethnicity, national origin, first language, religion, age, and disability. As a member of the George Mason University community, the Computer Science department plays an integral role in building an educational environment that is committed to anti-racism and inclusive excellence. For more information on how to continuously cultivate the practice of anti-racism, see this guide from the National Museum of African American History and Culture on how to be anti-racist: https://nmaahc.si.edu/learn/talking-about-race/topics/being-antiracist.
- Title IX: As a faculty member and designated "Responsible Employee," I am required to report all disclosures of sexual assault, interpersonal violence, and stalking to Mason's Title IX Coordinator per university policy 1412. If you wish to speak with someone confidentially, please contact the Student Support and Advocacy Center (703-380-1434) or Counseling and Psychological Services (703-993-2380). You may also seek assistance from Mason's Title IX Coordinator (703-993-8730; titleix@gmu.edu).
- Student Support Resources on Campus: https://stearnscenter.gmu.edu/knowledge-center/knowing-mason-students/student-support-resources-on-campus/.
- Incomplete Grades: https://chssundergrad.gmu.edu/other-forms/incompletes.
- Campus Closure due to Weather: If the campus closes or class is canceled due to weather or other concern, students should check Blackboard/Piazza for updates on how to continue learning and information about any changes to events or assignments.

Safe Return to Campus Statement: *All students taking courses with a face-to-face component are required to follow the university's public health and safety precautions and procedures outlined on the university Safe Return to Campus webpage (https://www2.gmu.edu/safe-return-campus). Similarly, all students in face-to-face and hybrid courses must also complete the Mason COVID Health Check daily, seven days a week. The COVID Health Check system uses a color code system and students will receive either a Green, Yellow, or Red email response. Only students who receive a "green" notification are permitted to attend courses with a face-to-face component. If you suspect that you are sick or have been directed to self-isolate, please quarantine or get testing. Faculty are allowed to ask you to show them that you have received a Green email and to wear a mask, and are thereby permitted to be in class.*

6 Mental Health

- What is listed on the syllabus are our/Mason's usual course policies. However, this is not a "usual" time. We fully understand that each of us may face new obstacles, or old obstacles in novel ways, during this time. Please communicate with us if such things are getting in your way in this class. **Our goal is to facilitate your growth and success in this strange and uncertain time**; we can only do that if you tell us what is happening.
- If you are experiencing feelings of anxiety, panic, depression, sadness during the semester, Student Health Services and Counseling and Psychological Services Offices (703-993-2380) provides a range of resources to assist and support you.
- Students can call (703-993-2831) or walk-in during open hours to schedule an appointment to talk with a health care provider. If you or someone you know experiences a mental health crisis or emergency, seek help immediately. Call 911 for local emergency services, the National Suicide Prevention Lifeline (1-800-273-8255), or text the Crisis Text Line (741-741) anytime.
- We believe we learn best when we can show up as whole and healthy people. To learn effectively we need to have basic security: a roof over our head, a safe place to sleep, a stable place to live, and enough food to eat. If you are struggling to meet any of these basic needs, visit our campus food pantry (https://ssac.gmu.edu/patriot-pantry/), or reach out to other Mason resources https://learningservices.gmu.edu/campus-resources/. Remember, asking for assistance and advocating for yourself is an important part of your collegiate experience. **YOU** are not alone.

General Schedule:

This **tentative** schedule contains all the readings, intended lecture topic pace, labs, programming assignments and dates as of the start of the semester. We may drift ahead or behind the planned timing (especially if the weather or the pandemic causes any cancellations), so take it as an estimate and **always overridden by announcements**.

Reading Assignments Schedule:
- ZY readings refer to our online zyBook textbook. Make sure you are logged in to zybooks.com to get credit for reading completion!
  - Recommended: complete the readings before class; the lectures and labs will help you solidify the materials far better than if you are reading them after the fact.
- LANG readings refer to the Python Language Reference (online, free).
- LIB readings refer to the Python Standard Library (online, free).
- Slides and announcements are posted on Blackboard and/or Piazza.

- Last day to Add: 8/30
- Last Day to Drop with 100% Tuition Refund: 9/7
- Last Day of Semester: 12/4
- **Fall 2021 Final Exam Schedule here**
- **Other Important Dates found here**

Tentative Schedule

Week	Start Date	Lecture	Lab	Assignments **Assignments are always due by Noon Monday**	
				zyBook Readings	**Programming Assignment (PA)**
1	Aug 23	**Syllabus Review** **Basic Introduction to Programming:** • What is programming? • What is a programming language? • Why python? • Brief programming language history/philosophy • Compilers vs Interpreters **Computer Usage for Programmers:** • Minimal terminal or command line usage for programmers (e.g., changing directories, relative and absolute paths, command line utilities, running/executing code). • How to install and use text editor for programming. • Ethics topics. **Programming Basics:** ○ Numbers, variables, and expressions ○ Assignment ○ Strings and Printing ○ Basic Terminal I/O ○ Function Calls ○ Comments ○ The Concept of an Algorithm ○ Flowchart basics	L0: Python Setup Assistance	• **ZY 1(Intro)** • **ZY 2(Variables and Expressions)** • LIB (4.4): numeric types • LANG (2.3-2.3.1): identifiers and keywords • LANG (2.5): operators	No Programming Assignment
				Due Mon 8/30th Noon (12 PM)	

2	Aug 30	**Continue Programming Basics…** **Introduction to Testing/Debugging:** o How to read error messages effectively o Types of errors: syntax vs. semantic vs. logic o Tracing/Debuggers/Visualizing o Print Statement Debugging o Testing code using a tester file	L1: Python Basics	• **ZY 3 (Types)** • **ZY 4 (Functions Pt 1)** • LANG (2.1.3): comments • LANG (2.1.8): indentation • LIB (2 built-in functions)	PA1: Programming Basics (Basic Math Calculations)
				Due Mon 9/6th Noon (12 PM)	
3	Sep 06	**No Monday Classes – Labor Day** **Conclude Programming Basics** **Decision Making:** o Boolean expressions and operations o Comparisons o Basic Boolean logic o Selection Statements (e.g., if-else)	L2: More Python Basics	• **ZY 5 (Branching)** • LANG (6.10-6.11) comparisons, boolean operations • LIB (4.1-4.3) truth-value testing, boolean operations, comparisons • LANG (8.1) if statements • LIB (27.3-27.4) python debugger and commands	No Programming Assignment
				Due Mon 9/13th Noon (12 PM)	
4	Sep 13	**Conclude Decision Making** **Repetition with Loops and Loop Control:** o While o For o Break/Continue	L3: Branching	• **ZY 6 (Loops)** • LANG (8.2-8.3) while, for statements	PA2: Decision Making
				Due Mon 9/20th Noon (12 PM)	
5	Sep 20	**Conclude Repetition with Loops and Loop Control** **Sequences:** o Lists o Sequences and Loops o Sequence Operations o Mutability o Multidimensional Sequences	L4: Loops	• **ZY 7 (Lists)** • LIB (4.6.3) mutable sequence operations	No Programming Assignment Study for Midterm 1 Next Week!
				Due Mon 9/27th Noon (12 PM)	

Week	Date	Topics	Lecture	Readings	Programming Assignment
6	Sep 27	**Continue Sequences…** **Midterm 1 (Sept 29, 30)**	L5: Lists and Loops	• **ZY 8 (Strings)** • LIB (4.7.1) string methods • LIB (4.7.2) string formatting with % (see ZY 3.7) • LIB (6.1.3) string format method (see ZY 7.5)	PA3: Repetition
				Due Mon 10/4th Noon (12 PM)	

7	Oct 04	**Conclude Sequences**
		
		Computer Memory Basics:
		  o Variable Storage
		  o References vs. Values
		  o Variable Aliasing
		
		Other Collections:
		  o Dictionaries and Sets
			L6: Multi-dimensional Lists	• **ZY 11 (Dictionaries)**
				• LIB (4.10) Mapping Types
					PA4: Loop Controls with Sequences

				Due Mon 10/11th Noon (12 PM)	
8	Oct 11	**No Monday Classes on 10/11** **Monday classes meet Tuesday 10/12** **No Tuesday classes on 10/12** **Continue Other Collections…**	L7: Memory and References	• **ZY 9 (Functions Pt 2)**	PA5: Computer Memory Basics (Memory and Alias issues and Other Collections)
				Due Mon 10/18th Noon (12 PM)	
9	Oct 18	**User Defined Functions:** o Parameters and arguments o Scope o Passing mutable objects o Call stack o Problem decomposition with helper functions o Designing larger programs with functions	L8: Dictionaries	• **ZY 10 (Modules)**	No Programming Assignment Study for Midterm 2 Next Week!
				Due Mon 10/25th Noon (12 PM)	
10	Oct 25	**Conclude User Defined Functions** **Function Recursion** **Midterm 2 (Oct 27, 28)**	L9: Functions	• **ZY 13 (Recursion)** • **ZY 12 (Files)**	PA6: User Defined Functions
				Due Mon 11/1st Noon (12 PM)	

11	Nov 01	**Conclude Function Recursion**
		
		More Advanced Testing/Debugging with References and Aliases:
		  o Tracing/ Debuggers/Visualizing/
		  o Print Statement debugging
		  o Designing Tests
		
		Basic File I/O:
		  • Opening and Closing Files
		  • Reading input from files
		  • Writing output to files
		  • Exception handling for file I/O
			L10: Recursion	• **ZY 15 (Exceptions)**
				• LANG (4.3 Exceptions, 7.8 raise statement)
					PA7: Recursion

				Due Mon 11/8ᵗʰ Noon (12 PM)	

12	Nov 08	**Exception Handling:**
		  • Exceptions
		  • Exception Handlers
		  • Creating Exceptions
		
		Preview of Classes:
		  • Combining data and methods together
		  • Creation of simple classes
			L11: File I/O	• **ZY 14 (Classes)**	PA8: Basic File I/O

				Due Mon 11/15ᵗʰ Noon (12 PM)	
13	Nov 15	**Continue Preview of Classes…**	L12: Classes/ Exception Handling	No Reading	PA9: Classes/ Exception Handling
				Due Mon 11/22ⁿᵈ Noon (12 PM)	

14	Nov 22	**Conclude Preview of Classes**
		
		Packages and Libraries:
		  • Existing libraries for a given Language
		  • Creating packages
		
		Miscellaneous Topics
		
		No Wednesday/Thursday Classes Thanksgiving
			No Lab	No Reading	No Programming Assignment

15	Nov 29	Final Exam Review	Final Exam Review	No Reading	Study for the Final Exam!
16	Exam Period Dec 8 – Dec 15	**Final Exam Time/Location TBD**			