Demo	Dead end You are at a dead end of a dirt road. The road goes to the east. In the distance you can see that it will eventually fork off. The trees here are very tall royal palms, and they are spaced equidistant from each other	
	There is a shovel here. >look shovel It is a normal shovel with a price tag attached that says \$19.99. >take shovel Taken. >look Dead end You are at a dead end of a dirt road. The road goes to the east.	
	In the distance you can see that it will eventually fork off. The trees here are very tall royal palms, and they are spaced equidistant from each other. >east E/W Dirt road You are on the continuation of a dirt road. There are more trees on both sides of you. The road continues to the east and west. There is a large boulder here.	
	>look boulder It cannot be moved. >take boulder You cannot take that. >west Dead end >look Dead end	
	You are at a dead end of a dirt road. The road goes to the east. In the distance you can see that it will eventually fork off. The trees here are very tall royal palms, and they are spaced equidistant from each other. >east E/W Dirt road There is a large boulder here. >east Fork	
CPSC 225: Intermediate Programming	You are at a fork of two passages, one to the northeast, and one to the southeast. The ground here seems very soft. You can also go back west • Spring 2025	118



Adventure – Game Mechanics

- Do players move around within rooms, or only between rooms?
 - only between rooms
- What's the difference between G0 and MOVE?
 - no difference, just convenience (and compatibility with similar games that might use one term vs the other)
 - there are three alternatives for how players can move around:
 G0 direction, MOVE direction, or just direction by itself

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Adventure – World Building

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- Do the rooms have to align by direction, or can/must there be more complicated paths between rooms?
 - exits can only be to the north, south, east, and west but that doesn't mean the rooms have to be aligned in a grid



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- you should have something more complex/interesting than just a sequence of rooms where the only option is to move from one to the next, but otherwise it is up to you
 - in most cases, there should be more than one way to get to each room

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Adventure - Working With Files

- What's the link between the files and building the world?
- How do you approach getting data from a file into an object?
 - the handout defines file formats that contain all the information you need for the kind of thing (room, item, task)



- read all of the info for one room at a time, storing the values in variables
 - handout gives suggestions for parsing e.g. read a line at a time, use String's split method when a line contains several things separated by a delimiter
- create an object for the room once you have all the info for that room



Adventure – Working With Files

- How do you match up the order things are written in the file and the order they are going to be used in constructing the world?
 - the order rooms, items, tasks are listed in the file doesn't matter
 - to resolve references –

Building the World

In principle, you just read the data files and create the appropriate objects representing each thing. But there is a wrinkle when it comes to rooms, because there may be circular dependencies - for example, room A may be connected to room B which is connected to room C which is connected to room A. If a room stores references to its adjacent rooms, which one do you create first? This can be solved by making two passes through the rooms file. On the first pass, create all the room objects (with names, descriptions, etc but not which room is connected to which others) and store those objects so that you can easily look up which room object goes with which room name. On the second pass, add the neighboring rooms to the already-created room objects.

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Adventure

- The whole thing seems hard.
 - with any big task, the key lies in breaking it down into smaller pieces
 - follow the plan of attack in the handout!
 - start early enough so that you can come to office hours and/or TFs if you get stuck or want to go over your ideas

Plan of Attack

- Unlike Omino and Solitaire, you'll be identifying classes and methods yourself --- there is not a predefined design to implement
- Read through the <u>Specifications</u> and use textual analysis as discussed in class to develop an initial class design. For each class, give it a descriptive name briefly identify its purpose (what does it represent?), identify methods it will have, and identify information that it needs to store (instance variables).
- Outline the main program's task in pseudocode. Keep a big-picture view like an outline for a paper, cover all of the functionality of the main program (the
 paper's content) but at a high level (the main points) without all of the details (the actual text of the paper).
- Describe the plot for your version of Adventure what's the overall theme? What tasks must the player accomplish to win the game? Also identify the rooms
 and items, and draw a map showing how the rooms connect, where the items are initially, where the player starts, and where the goal room / exit is.
- These three elements the class design, the pseudocode for the main program, and the description of your plot are due by the design deadline given at the beginning of the handout.
- While you are waiting for feedback on your design, get started on several elements of the project that don't depend on the class design:
- Create the rooms, items, and scoring files for your plot.
- Implement file parsing write a main program to read each of the files. For now, focus on reading and assembling the information from the files for each
 room, for example, initialize local variables for the name/description; each of the north, south, east, and west rooms; and the description as read from the file,
 then print out each of those variables so that you can lell the right information was read.

Adventure – Class Design

- Do we need a specific number of classes? Or can we make classes as we see fit?
 - the design is up to you, but it should be a good design
 there should be classes for the things not well represented by an existing type
 - each class should have a single purpose
- How do we know if the program design is complete, and on the right track? Will problems with the design ruin the whole program?
 - a poor design can make it more difficult to successfully complete the program while a good design can make it easier
 - the separate (and earlier) deadline for the design is so you can get feedback on it before proceeding with the implementation

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Scrabble Design			in progress – complete methods and resolve maybes by thinking about how each kind of object will be used in the program – this comes from the game play described in the rules and the pseudocode written to cover the main program functionality		
class	represents	stored	info	methods	
player	a single player in the game	their tiles (rack) score name stats – number of times games won, words play	they've gone first, ∕ed,	getters for most things constructor – param: name add points to the score put a tile on the rack in a particular position add a tile to the end of the rack remove tile from a particular position	
players	all of the players in the game	the players - sequence			
board	the game board – the points and the tiles placed there	the tiles placed on the l locations) the scoring for each squ board squares maybe – arrangement of	board (and their uare of board squares		
tile	one letter tile	letter point value			
bag	holds the tiles not yet drawn	tiles in the bag – jumble	2	constructor – make a bag full of all the tiles switch tiles – param: a tile not in the bag, return: a tile in the bag draw a random tile size or isEmpty	
rack	holds each player's tiles	tiles on the rack – sequence in a row		ut a tile on the rack in a particular position nove a tile / swap tiles based on position emove a tile by letter add a tile to the end of the rack emove tile from a particular position	
board space	one space on the board	scoring info for that spa tile, if any, in that space maybe – location on the	ice e board (row,col)	getters put a tile in this space remove a tile from this space – maybe, depending on how challenges are handled	
game	game logic	local variables - board,	players, bag,		
scrabble	main program				
word list	list of valid scrabble words	valid scrabble words			

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Class Designs

- distinguish between single things and collections, and between individual instances and properties of a thing
- use singular names for singular things, plural names for collections
- include classes for single things when those single things are complex
 - i.e. more than one piece of information
 - i.e. any non-trivial behavior
- include classes for collections of things (only) when the standard collections (e.g. List, Stack, Queue) are not good matches

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Adventure – Pseudocode

- pseudocode is the program in English rather than Java
 steps rather than a description of the rules
- pseudocode should reflect the structure of the program
 - identify loops and conditionals
 - indent bodies

Design Principles and Guidelines

- classes should have a single purpose
 - if you can't quickly summarize the purpose...it's too much
- separation of concerns
 - separate the handling of commands from the user interface (helper methods)
- methods belong in the class where...
 - ...they access/manipulate stored info in that class
 - ...they fit with the purpose/responsibility of that class
- methods should provide only the access needed
 - avoid getters that return objects or collections when only something specific is needed
- consider information flow
 - identify parameters what additional info does the method need for its task?
 - identify whether or not there's a return value (and what it is)

Scrabble Main Program

- start with a broad outline of the main program tasks
 - cover all the functionality, just not all the details

set up game determine who goes first each player draws 7 tiles from the bag and adds them to their rack repeat

current player takes a turn switch to the next player until the game ends do final score updates

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Scrabble Main Program

 refine by filling in more details 	player chooses action — pass, exchange (if there are at	
<pre>// set up game initialize list of valid words put tiles into bag</pre>	least 7 tiles in the bag), or play if pass	
// determine who goes first	do nothing	
the beginning of the alphabet goes first	else if exchange exchange one or more tiles	
each player draws 7 tiles from the bag and adds them to their rack	for an equal number from the bag	
repeat current player takes a turn switch to the next player until a player is out of tiles or there have been 6 successive scoreless turns and a	else if play player plays tiles on the board, using or adjacent to at least one tile already on the board	
player decides to end the game	if the word(s) formed are	
<pre>// do final score updates for each player if they have unplayed letters</pre>	not legal word(s), remove the tiles from the board	
reduce the player's score by the total of their unplayed letters	otherwise score the tiles played	
else increase the player's score by the total of the opponent's unplayed letters	<pre>player replenishes their tiles by drawing from the ' bag</pre>	





Adventure – Game Mechanics

- Is there a duration requirement or limit to how long the game should take?
 - no (though be reasonable)
 - there minimum requirements for the number of rooms, items, and winning
 - extra credit is possible for going beyond that, though an extremely elaborate world is not the most efficient way to earn extra credit

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Adventure - Game Mechanics

- Are points displayed to the user while the game is in progress?
 - the goal and the tasks needed for winning are not displayed to the player – discovering that is part of the game play
 - point values for tasks are not displayed directly
 - there is a SCORE command which displays the player's current score



Adventure – World Building

- Should different rooms be procedurally generated and random for each play through, or is the game the same every time?
 - the world and goals are the same every time
 - elements of randomness can be included for extra credit, but be careful to keep all of the specific world configuration within the files

Adventure – World Building	
 How do we link a room to multiple other rooms? 	
 an option is the same way you link list nodes or tree nodes t other nodes 	0
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Adventure - Scoring and Winning

 It seems like we'll need some sort of collection with tasks and how much those tasks are worth

– yes

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Adventure - Scoring and Winning

- The whole thing seems hard, but especially scoring and winning.
 - with any big task, the key lies in breaking it down into smaller pieces
 - follow the plan of attack in the handout!
 - scoring and winning isn't especially difficult by itself, but again the key is breaking things down into smaller pieces
 - leave it to the end as suggested in the plan of attack (but also leave yourself time)
 - · consider where scoring gets incorporated into the game play
 - points are scored when the player does a particular action involving a particular room or item
 - choose an ADT that helps you
 - points are scored when the player does a particular action involving a
 particular room or item, so each time an action happens you need to
 determine the number of points, if any, for that action involving that room/item

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 start early enough so that you can come to office hours and/or TFs if you get stuck or want to go over your ideas