









UNIT 1: JEROO






Welcome to the first unit of *AP Computer Science*! This AP Computer Science class is all about the logic behind how computers and computer programs function. We'll start right at the very beginning with this first unit, and then move on to all the complexities of computer science as the year progresses. Here though, your job is to jump into the beginnings of making programs and thinking through the logic needed to solve various puzzles. In the end, the expectation is that you learn the following:

- How to use an IDE to write, run, and troubleshoot your own programs using JAVA
- How to create objects, run methods, and use simple parameters to solve problems
- How to find problems in syntax within your code
- How to use control structures – like the while loop, if statements, and if-else statements – to solve problems

As we move through this unit, you are responsible for making adequate progress through the assignments, and for being done by the Unit Due Date (**September 6, 2019**). You are also responsible for completing each part before moving on to the next. Our unit is broken up into three main parts:

Part 1: Beginning with Jeroo (30 pts) Approx. 2 days	
Our study of computer science begins with an introduction to writing basic programs in Java using a simulation called "Jeroo". Jeroo is a great way to learn the basics of a programming language because we get immediate visual feedback about what our program is doing, and making changes is super easy. We'll start with a few basic programs to get thinking!	 Basic Jeroo Notes & Introduction
	 Complete 4 Beginning Challenges
	 Write Log 1: <i>AP Computer Science</i>
	 Check-off from Mr. Benshoof

Part 2: Advanced Jeroo (40 pts) Approx. 4 days	
Now that you've got the basics of Jeroo programming down, it's time to tackle some tougher Jeroo challenges. As you continue working with Jeroo, you'll need to be able to write a program that can actually make choices using both <i>Boolean values</i> and <i>control structures</i> . The ability to have your Jeroo do more complicated things gives us the power to make programs that are truly impressive!	 Advanced Jeroo Notes
	 Complete 4 Advanced Challenges
	 Jeroo Assignment
	 Check-off from Mr. Benshoof

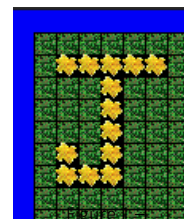
Part 3: Super Challenges (30 pts) Approx. 3 days	
Finally, you'll get to choose one (1) super challenge and see if you can complete it in Jeroo. These challenges are particularly tough, so you'll need to really think through your problem solving strategy and write a program that is as efficient as you can make it. Choose wisely, and be ready for a genuinely difficult challenge!	 Unit 1 Quiz (Sept 3)
	 Pick a Jeroo Super Challenge
	 Try and complete the challenge!
	 Write Log 3: <i>Jeroo</i>
	 Check-off from Mr. Benshoof

(30 pts) Approx. 2 days

The first part of our unit gives us a beginning introduction to the world of *Jeroo*. The Jeroo simulation is a small self-contained programming simulation that lets you write real Java programs in the left part of the screen, and see the resulting output as little arrow-shaped “Jeroos” hop around on an island planting flowers. It’s a lot more fun than it sounds, and it ends up being an absolutely *perfect* introduction to the world of programming!

1. Start by watching the three introductory videos on our website: *Jeroo Introduction 1 & 2*, and *Jeroo Methods*. These videos give a good overview of all the parts and pieces available in Jeroo. Take a full page of notes on the ideas presented in these videos.
2. ***DOWNLOAD*** the Jeroo files from our website. The folder needs to be extracted to the desktop and contains the Jeroo simulation as well as all the special maps you’ll need to work with this unit!

3. **Challenge 1: FIRST INITIAL** Develop a program that creates a new Jeroo named after you! The Jeroo should start at location (2,3), and should start holding 50 flowers. The Jeroo should then hop around on the island planting flowers that create your first initial. In the example to the right, Jeroo “Jeremy” has hopped around and planted flowers in a “J”:



The Island After Jeremy Plants The Letter “J”

Challenge 2: TWO INITIALS Develop a program that has two methods in the “Jeroo Methods” tab. One method should tell your Jeroo how to hop and plant your first initial (like in Challenge 1), and the second method should tell your Jeroo how to hop and plant your second initial. Then use the “main method” to create a Jeroo and have it hop out both of your initials. In the example below, a Jeroo has hopped out it’s initials “ME”:

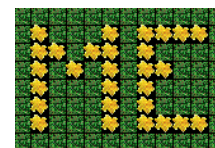


Figure 2 – The Island After the Jeroo Plants The Letters “ME”

Challenge 3: NET DISABLE Develop a program that uses the included island file (in the map folder) to create a new Jeroo at the location (0,0). The Jeroo should pick the flower then use it to disable the net so it can get home. (Home is the square of nets).

Challenge 4: RELAY RACE Develop a program that makes 4 Jeroos at these locations and directions: (1,1,EAST), (1,23,SOUTH), (23,23,WEST), (23,1,NORTH) and places them on the included island. The Jeroos are running a relay; the first Jeroo pick up the flower. It should then run clockwise and disable the net so it can meet the Jeroo in the top-right corner. That Jeroo should then pick the nearby flower, and use it to get to the bottom-right corner. That Jeroo then uses the flower to reach the bottom-left corner. That Jeroo then picks the flower and runs up to end at spot (0,0).

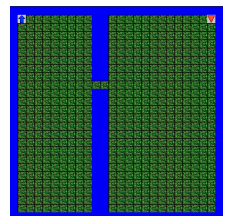
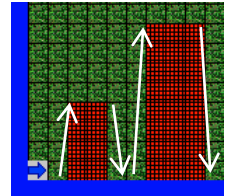
Part 1: Tasks	4 points	3-2 points	1-0 points
Jeroo Notes	+ Watch all <i>Jeroo Introduction</i> presentations + You took a full page of notes on Jeroo and basic programming	- Less than a full page of Jeroo notes	- Very brief or no notes in your notebook
Beginning Challenge 1	+ You completed the first Beginning Challenge: <i>first initial</i>	- You never got the program working fully	- You did not attempt the challenge
Beginning Challenge 2	+ You completed the second Beginning Challenge: <i>two initials</i>	- You never got the program working fully	- You did not attempt the challenge
Beginning Challenge 3	+ You completed the third Beginning Challenge: <i>Net Disable</i>	- You never got the program working fully	- You did not attempt the challenge
Beginning Challenge 4	+ You completed the fourth Beginning Challenge: <i>Relay Race</i>	- You never got the program working fully	- You did not attempt the challenge
Jeroo Assignment	+ You completed the Jeroo Assignment	- You only completed part of the assignment	- You did not complete the assignment



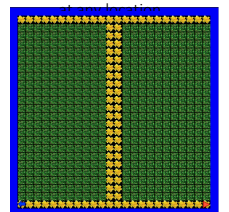
(40 pts) Approx. 4 days

Now that we have an understanding of the basics of Jeroo creation (“instantiation”) and how to use methods to make them do things, it’s time to learn about control structures. Control structures – like “if”, “if-else”, and “while” can make Jeroos do things repeatedly or make Jeroos only do things in certain circumstances. Here you’ll learn how these new tools work, and then use them to solve much trickier *advanced Jeroo challenges!*

1. Watch the introductory videos on control structures in Jeroo. Take good notes on each, and think about the difference between each of them.
2. **Challenge 5: HURDLES** The Jeroos are running hurdles. Develop a program that creates a Jeroo along the very bottom of the island (for example 23,0). They should run left to right and each time they encounter a vertical row of nets they should run up and over them. For example, a Jeroo on the island below would follow the arrow to get around the nets. This program should work for *any* configuration of net “hurdles” provided in the the Jeroo download.



One possible island; the program needs to handle vertical streams



The resulting pattern of flowers when the program is complete

Challenge 6: TOM AND TAMMY Tom and Tammy are in love, and today’s the day that Tom is going to propose. According to custom, Tom must present Tammy with a flower as an official sign of his intentions. Tom lives in the extreme northwest corner of the island, and Tammy lives in the extreme northeast corner. The dividing river runs north and south, dividing the island roughly in the middle; the river is at least 5 cells away from the western and eastern edges of the island. The river, itself, is exactly two cells wide. Fortunately, for the lovers, there is a bridge somewhere to the south of their homes. Tom has asked Tammy to meet him at the middle of the bridge. While she suspects his motives, she doesn’t want to appear too anxious

The purpose of this program is to have Tom and Tammy find the bridge and meet in the middle where Tom will give an engagement flower to Tammy. After he has given her the flower, each returns to its home and faces the home of its betrothed. Each Jeroo starts at its home, Tom at (0,0) and Tammy at (0,23). Each can start facing any direction. Tom starts with one special flower in his pouch

Challenge 7: BUGS & DAFFY One Saturday morning, two friends, Bugs and Daffy, decide to meet and plant flowers to beautify Santong island. Daffy starts in the Northwest corner facing East with 90 flowers in his pouch. Bugs starts in the Northeast corner facing West with 90 flowers in his pouch. Bugs and Daffy begin hopping toward one another. As they hop, each plants exactly one flower at every location it enters, including its starting location. They meet, facing each other, roughly in the middle of row 0. After a handshake and a little small talk, Bugs and Daffy both turn toward the south and continue planting flowers all the way to the southern edge of the island. When both reach the South Sea, they say goodbye and part. Daffy turns west and plants flowers all the way to the Western Ocean. Bugs turns east and plants flowers all the way to the Eastern Ocean. This is where our story ends. Your task is to write a Jeroo program that will illustrate this story.

Challenge 8: FLOWER COPY The Jeroos are practicing planting flowers in special patterns. Develop a program that makes a Jeroo that walks along the top edge of the island shown. As your Jeroo hops along it should plant a flower right above any flower it hops next to.



The starting orientation of one of the test islands



The final orientation of the test islands when the program is complete

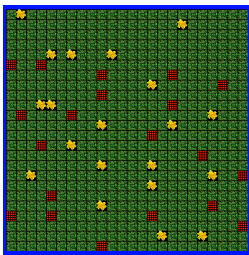
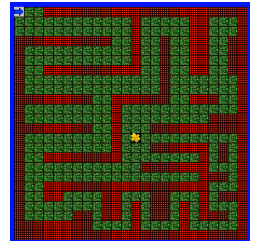
Part 2: Tasks	8-7 points	6-4 points	3-0 points
Jeroo Notes	+ You took a full page of notes on control structures in Jeroo	- You took less than a full page of notes	- Your notes are lacking or missing
Advanced Challenge 5	+ You completed the Advanced Challenge: <i>Hurdles</i>	- You never got the program working fully	- You did not attempt the challenge
Advanced Challenge 6	+ You completed the Advanced Challenge: <i>Tom & Tammy</i>	- You never got the program working fully	- You did not attempt the challenge
Advanced Challenge 7	+ You completed the Advanced Challenge: <i>Bugs & Daffy</i>	- You never got the program working fully	- You did not attempt the challenge
Advanced Challenge 8	+ You completed the Advanced Challenge: <i>Flower Copy</i>	- You never got the program working fully	- You did not attempt the challenge
Checkoff from Benshoof	+ Mr. Benshoof got to see your successful challenges	N/A	N/A



(30 pts) Approx. 3 days

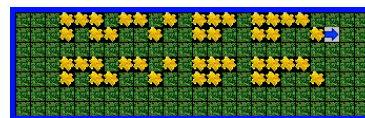
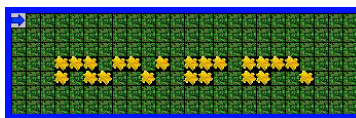
As we wrap up our time with Jeroo, it's essential that we tackle one last super challenge! So far you've done basic things with simple hop/plant commands. Then you did more advanced things with boolean questions like "isNet" and "isWater" as part of a complicated if/else question system. Now it's time to combine everything you know about Jeroo as you try to tackle one last super challenge.

1. Before you jump into the super challenge of your choice, take some time to take the Unit 1 Quiz: Jeroo available on our website. You only get 1 attempt at this quiz, and you must work alone. You ARE allowed to use your engineering notebook, though!
2. Watch the introductory video about the super challenges. This video simply introduces each one and gives a little simple advice that you might want to consider. Then, pick one (1) super challenge that you want to try and complete!
3. The super challenges are described below. Pick the one you want to work on, and take a page of notes in your engineering notebook about possible challenges, problems, tools, and solutions that your super challenge will bring with it. Then, see if you can solve it!
4. **Challenge 9: THE MAZE** Your Jeroo is now like Theseus (from Minotaur battling fame). Create a Jeroo that can navigate a maze made of nets. The Jeroo should start at (0,0), enter the maze, pick a flower somewhere in the maze, then get back out. The real challenge to this, is that the same program you write for one maze needs to be able to work on ALL provided maze maps!



Challenge 10: ISLAND CLEAR Develop a program that creates a Jeroo at (23,23) with no starting flowers and has the Jeroo run around and pick up all the flowers on the island, then use them to disable all the nets on the island. Again, the program you write for this island needs to work on ALL provided net/flower islands.

Challenge 11: FLOWER COPY 2 Develop a program that creates a Jeroo with a pouch full of flowers (like 50 or so). The Jeroo should then hop around to create a copy of the pattern of flowers that already exist on the island.



The starting and finishing orientation of one of the test islands

5. Have Mr. Benshoof check your progress on your super challenge at the end of the unit!

Part 3: Tasks	10-8 points	7-4 points	3-0 points
✔ Unit 1 Quiz	+ Up to 10 points – your grade is based on how many questions you get correct		- You did not take the Unit 1 quiz before August 30
📄 Super Challenge Notes	+ You clearly picked one (1) super challenge + You have some good notes/plan/ideas written in your engineering notebook	- Your notes or plan are lacking important parts	- Your notes or plan are totally missing
⊕ Super Challenge	+ You were able to solve the super challenge!	- You made progress on your super challenge	- You did not start your super challenge at all
☆ Checkoff from Benshoof	+ Mr. Benshoof got to see your Super Challenge progress	N/A	N/A

