**Name:**

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**Directions:**

* Watch the documentary “The Secret Rules of Modern Living: Algorithms”.



* This documentary is easily available on **Netflix,** or via this link: <https://www.youtube.com/watch?v=T1os88EvPc4>

(If you can’t access this documentary, email me ASAP.)

* Answer the following questions as you watch. You can just type your answers into this google doc. When you are done….hit the TURN IN button (don’t share it with me, or email it, just click Turn In).
* Note - the boxes will expand as you type, so use as much space as you need.
* Do a nice job on this - it’s a great overview of some important concepts. Remember, this is an AP level course.

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| **Euclid’s Algorithm** |
| What is the purpose of Euclid’s Algorithm? |
| In your own words, describe the steps in Euclid’s Algorithm using the tiles. Please number your steps.**Start With: A rectangle**     **You’re Done When:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| What is one of the rules that an algorithm needs to follow? |
| **Google’s PageRank Algorithm** |
| What are the two things PageRank looks for in its algorithm (in other words: what are its *inputs*)? |
| Explain why the PageRank algorithm needs to be constantly updating. You can use the soccer analogy if it’s easier to explain |
| **Sorting Algorithms** |
| Why is it called Bubble Sort? |
| In your own words, describe the steps of the BubbleSort algorithm. Please number your steps. You will probably use the words ‘if’ and ‘repeat’ in your answer.**Start With: Unsorted blocks with your hands on the first pair of blocks**          **You’re Done When: The Blocks are Sorted** |
| Describe the two parts of the Merge Sort algorithm |
| Why is it better to use MergeSort over BubbleSort? |
| **Pause the video….Click on this link real quick:**https://www.youtube.com/watch?v=k4RRi\_ntQc8 |
| This is a 1-min video clip of then-Senator Barack Obama at Google, taking questions while he was campaigning to become president.What is the question the CEO of Google asked him?What was Obama’s answer:Even Obama knows about bubble sort efficiency! :) |
| **OK - back to the Algorithm documentary….****Matching Algorithm** |
| What type of problem were mathematicians trying to solve when they came up with this algorithm? |
| Describe what happens in the first round of the algorithm: Each of the Queens \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ After this, any king with multiple proposals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Describe what happens in the second round of the algorithm: Each of the Queens \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ After this, any king with multiple proposals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| How can you tell when the algorithm is finished? |
| **Traveling Salesman Problem** |
| What is the Traveling Salesman Problem? Describe it to someone who may have never heard of it.  |
| What is one possible way to solve this problem? |
| How many possible routes are there for just 10 cities (as an estimate)? |
| Describe why the bee is a good real-world example of the Traveling Salesman problem |
| Does the bee discover the ‘best’ / ‘most efficient’ route as it travels? (yes or no) |
| What is a Heuristic Algorithm? |
| Why is it better for the bee to use a Heuristic Algorithm rather than trying to find the best solution every time? |
| **The Airport Heuristic Algorithm** |
| What is the goal of the airport control tower? |
| Describe in 1-2 sentences how the algorithm tries to predict when a plane should begin its takeoff process. |