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| **Teacher: ROSE** |
| **Date: 8/14/18** |
| **Subject / grade level: Computer Science - AP CS Principles** |
| **Materials:**  statsDemo\_teacher  statsDemo\_student |
| **Essential Question(s):**  How do we calculate common statics such as sum, average, and rate?  How can we use functions with parameters to add modularity to a program?  How can we use while loops to convert between the orders of magnitude of a byte? (b,B,KB,MB,GB)  When should we use for-loops vs while-loops? |
| **Essential Standards (NGSS) and (CCSS):**   |  |  |  | | --- | --- | --- | | **Science & Engineering Practices (SEPs)** | **Disciplinary Core Ideas (DCIs)** | **Crosscutting Concepts (CCs)** | | N/A | N/A | **N/A** |   **Common Core State Standards (CCSS):**  **Algorithms and Programming**  3A-AP-13: Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.  3A-AP-14: Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.  3A-AP-17: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. |
| **Lesson objective(s) - *Students will demonstrate understanding or learning around the following Big Ideas:***  *SWBAT use iteration to perform basic calculations on a set of data and determine when to use a for-loop vs a while loop.*  *SWBAT use functions with parameters to avoid code repetition and uses pieces of the same code to accomplish more than one task.* |
| **Differentiation strategies to meet diverse learner needs:**  Extension: output layer 2 data (MAC addresses) |
| **ENGAGEMENT (*Anchoring Phenomenon*)**   * Teacher will introduce demo * Students/teacher will ask how each metric is calculated and if it involves a for-loop or a while-loop. * A) For loop: summing packets and bytes * B) While loop: converting unit |
| **EXPLORATION**   * As a class, develop a flowchart for the convert function. * What parameters does it take?(data,unit) * What does the loop look like? (while) * How do we handle the different cases? (if-statements) * A) data/speed * B) units: Kilo/Mega/Giga |
| **EXPLANATION**   * When to use for-loops vs while-loops * A) For: known amount of iteration * B) While: unknown amount of iteration * When to create functions * A) Whenever code is repeated, separate different chunks of code, make code more readable * When to add parameters to a function * A) Access local variables or behave differently according to input (parameter) |
| **ELABORATION**   * Students will be provided with statsDemo\_student which lists the tasks that need to be completed. |
| **EVALUATION**   * statsDemo * //Part 1: Statistics * //1.1: sum bytes * //1.2: calculate & output statistics * // a) elapsed time * // b) packets/sec * // c) avg packet size * // d) data transfer rate * //1.3: add a function to convert to appropriate units * //1.4: optional: output text as html using a div * //Challenge: separate layer 2 and 3 packets |
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