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| **Teacher: ROSE** |
| **Date: 8/14/18** |
| **Subject / grade level: Computer Science - AP CS Principles** |
| **Materials:**statsDemo\_teacherstatsDemo\_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):**

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| **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
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| **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
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| **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)
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| **ELABORATION*** Students will be provided with statsDemo\_student which lists the tasks that need to be completed.
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| **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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