LEARNING MODULES

GK-12 DISSECT at New Mexico State University

Title: Fingerprint Algorithm

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Discipline or Area: Forensics

Teacher: Jeri McDowell

School: Mayfield

Subject of class: Forensics

Grade: 10th, 11th, 12th

COVERAGE OF COMPUTATIONAL TOPICS

Provide a brief description of the topics and vocabulary you covered with this module.

Algorithm
Branching
Correctness
Clarity
Iteration

OBJECTIVES

Provide a brief description of what the students will learn from this module.

The objective of this module is to have the students generate an algorithm that if followed by others would produce an accurate 10-Print Fingerprint card. The algorithm generated will include branching and iteration and be tested for clarity and correction when the outside parties follow it.

EQUIPMENT AND MATERIALS

What equipment and materials are needed for this module?

10-Print Fingerprint card (See attached image for example file)
Inkpad
Paper & Pencil

BACKGROUND AND REFERENCES

What is the purpose of this module, and how does it relate to the content of the teacher's current lesson plans? Where are you getting your information and theories? Have any other researchers been involved in development?

This lesson fits directly with a lab in the current curriculum of the class. The lab in question requires the students to create a 10-Print Fingerprint card such as the ones used by law enforcement. By extending this lab the students not only gain a better understanding of how to create a 10-Print Fingerprint card because the level of comprehension required to instruct a task is greater than the level required to complete a task.

PROCEDURE

Provide detailed instructions on how this module is taught.

1. Begin with the standard lab of how to create a 10-Print Fingerprint card.
2. Revisit briefly about algorithms, sequence-of-steps, branching, and iteration.
3. Have the students individually or in pairs create an algorithm to create a 10-Print Fingerprint card as they just completed.
    a. Remind students that their algorithms will be given to people with no prior experience with this.
    b. Give the students half a class period to create their algorithms.
4. Collect the algorithm from each student.
5. Give the algorithms to people who are capable of following the steps exactly as described regardless of if it makes sense or not. Stress the goal of this exercise is to enforce clarity and correctness and that mistakes are expected in the algorithms.
6. At the next possible class period return the algorithm and results to each student.
7. After a moment of self-review by the students review the results as a class.
    a. Emphasize areas that the students struggled with the most.
    b. Tie in how computers need absolute instructions to produce the correct results [clarity] and how a lack of this caused the errors.

What were the "learning goals?"

Students should have a better understanding of how to create an algorithm.
Students should also be able to explain what clarity is and how clarity would help spot the errors in their algorithm.
Students should also be able to explain what correctness is and how correctness is important in an algorithm.
Students should also be able to recognize iteration and how they have used it in their algorithm (same basic steps for each finger).
Students should also be able to recognize branching and how they used it in their algorithm (needing to start over if a print is invalid, etc.)

How did you introduce CT?
CT is introduced throughout the module and should be tied with any and all previous lessons.

How could you assess the understanding of CT in this module?
Assessment is used initially in the results of the algorithm and then in the reflection phase.

NOTES AND OBSERVATIONS

What were challenges you encountered in the overall development of the module?
This module is the culmination of the knowledge gained in the first two attempts at it. Originally not enough time was spent reflecting upon the algorithms created nor were the results compared soon enough.

What was successful?
This module ties together a lot of concepts in a very concrete way and ties directly into their school curriculum. Students have a lot of fun seeing how everything works together and the differences between the algorithm they wrote and the results that they received.

How was the students' reception to the content of the module?
Students seemed to enjoy the module quite a bit and were very engaged in all the post discussion.

APPLICANT
* See Privacy Act Notice on Back

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RESIDENCE OF PERSON FINGERPRINTED

DATE | SIGNATURE OF OFFICIAL TAKING FINGERPRINTS

EMPLOYER AND ADDRESS

REASON FINGERPRINTED

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FBI NO. FBI

ARMED FORCES NO. MNU

SOCIAL SECURITY NO. SOC

MISCELLANEOUS NO. MNU

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CLASS

REF.

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6. L. THUMB	7. L. INDEX	8. L. MIDDLE	9. L. RING	10. L. LITTLE

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