Indiana CTE

Computer Science I

Problem Analysis

1 **Students analyze a problem and develop a solution by creating a computer program.**

1. Identify how to use a computer program to solve a problem CS1-1.1
2. Construct interactive computer programs that accept various forms of input and produce various forms of output, as a solution to a computer programming problem CS1-1.2
3. Use print charts, file layouts, program narratives, hierarchy charts, and system flowcharts, which accurately depict the problem assigned and describe the solution CS1-1.3
4. Report the program schematics and usage CS1-1.4
5. Identify the standard program flowchart symbols and use them correctly within the context of the basic control structures of sequence, selection and looping CS1-1.5

Software Tools

1 **Students apply and adapt software tools to develop a computer program.**

1. Construct a program that processes information CS1-2.1
2. Identify programming languages as procedural or object oriented CS1-2.2
3. Develop programs using reusable modules (modularization) CS1-2.3
4. Use debugging techniques to correct and validate the computer program CS1-2.4
5. Construct the program in a high-level programming language based on a created design CS1-2.5
6. Construct a program that opens and closes a file CS1-2.6

Algorithm

1 **Students design a solution to the problem using algorithms.**

1. Develop algorithms to solve a computer programming problem(s) CS1-3.1
2. Assess the use of algorithms to provide a solution to a programming problem CS1-3.2
3. Use pseudo code to describe a solution to a programming problem CS1-3.3
4. Create a program flowchart and ANSI standard flowcharting symbols to define a solution to a programming problem CS1-3.4
5. Explain how the algorithm can be used to solve a problem CS1-3.5

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tudents create a functional computer program.

1 Define the process of programming CS1-4.1

2 Create a computer program that corresponds to an algorithm or proposed solution CS1-4.2

3 Define programming structures CS1-4.3

4 Recognize data variables and constants CS1-4.4

5 Recognize local scope and global scope CS1-4.5

6 Use conditionals (IF statements) CS1-4.6

7 Use loops (while statements, for statements) CS1-4.7

8 Define single and multidimensional Arrays CS1-4.8

9 Use functions and methods to break down the program logic and support reuse CS1-4.9

10 Define the graphical user interface CS1-4.10

11 Identify the parts of the programming platform CS1-4.11

12 Identify different types of errors and handle them programmatically CS1-4.12

13 Use the order of operations when using calculations CS1-4.13

Program Verification and Debugging

1 Students prove a computer program solution works by using verification and debugging techniques.

1 Predict and explain output CS1-5.1

2 Identify cause/effect for input/output CS1-5.2

3 Perform input validation CS1-5.3

4 Scrutinize peers code for errors CS1-5.4

6 Students connect an associated task with the code by providing documentation.

1 Describe the function of a computer program

2 Identify the purposes of a computer program

3 Explain concepts related to a computer program

4 Describe how to use a computer program

5 Identify cause/effect by explaining input and output

6 Interpret input/output