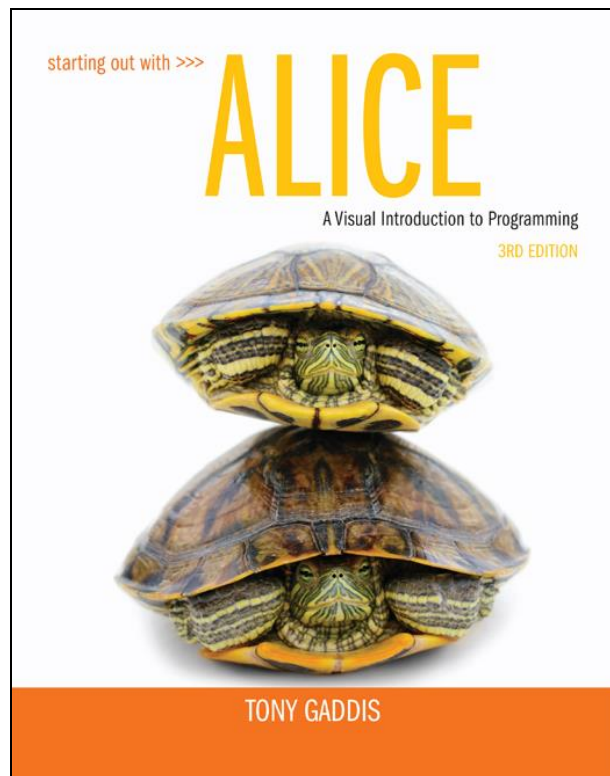


A Correlation of

# Starting Out with Alice

## A Visual Introduction to Programming

3<sup>rd</sup> Edition, ©2013



To the

# Utah Core Standards for Computer Programming I

**A Correlation of Starting Out with Alice: A Visual Introduction to Programming, 3e ©2013 to the Utah Core Standards for Computer Programming I**

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**Author:** Gaddis, Tony

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<b>Utah Core Standards for Computer Programming I</b>	<b>Starting Out with Alice A Visual Introduction to Programming 3<sup>rd</sup> Edition, ©2013</b>
<b>COMPUTER PROGRAMMING IA (SEMESTER 1)</b>	
<b>CORE STANDARDS, OBJECTIVES AND INDICATORS</b>	
<b>STANDARD 1</b>	
Students will be familiar with and use a programming environment.	
<b>Objective 1:</b> Demonstrate knowledge of external and internal computer hardware.	
a. Describe the functions of basic computer hardware devices (monitor, printer, CD-ROM drive, floppy drive, keyboard, mouse, adapters, other devices).	The focus of Starting Out With Alice: A Visual introduction to Programming, 3e is to teach computer programming using Alice, a three-dimensional graphical software system. This objective falls outside the scope of this program.
b. Describe the functions of the internal components of computers (CPU, RAM, ROM, Motherboard, graphics card, hard drive).	This objective falls outside the scope of this program.
c. Utilize the binary numbering system (translate from binary to decimal and vice-versa).	For supporting content, please see <b>SE: 3, 51</b>
<b>Objective 2:</b> Demonstrate knowledge of software concepts.	
a. Define the distinction between computer software and hardware.	This objective falls outside the scope of this program.
b. Identify software categories such as Application Software, Web Based Software, OS, Utility Software (anti virus, system tools).	This objective falls outside the scope of this program.
c. Describe the difference between an interpreted language vs a compiled language	<b>SE: 2-4</b>
d. Describe the difference between a low level and high level language	<b>SE: 1, 2-4, 51-53</b>
<b>Objective 3:</b> Develop the ability to use a current operating system.	
a. Demonstrate how to open and save files.	<b>SE: 218-220</b>
b. Demonstrate how to move, rename, copy, compress and delete files.	<b>SE: 29, 217-221</b>
c. Demonstrate how to display and print files.	<b>SE: 104-105</b>

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d. Create and use appropriate directory and path structures	<b>SE:</b> 29, 217-221
e. Demonstrate how to execute a program.	<b>SE:</b> 57, 97
<b>Objective 4:</b> Demonstrate the ability to use the editor to write code.	
a. Demonstrate the process of selecting a block of text.	Alice uses a drag-and-drop interface rather than a traditional text editor. Therefore, this objective falls outside the scope of this program.
b. Demonstrate how to move, copy, and delete blocks of text.	This objective falls outside the scope of this program.
<b>Objective 5:</b> Demonstrate the ability to compile, debug, and execute programs.	
a. Demonstrate how to use the editor to compile and run programs.	<b>SE:</b> 6-11
b. Understand the difference between syntax, run-time, and logic errors.	<b>SE:</b> 6, 81
c. Demonstrate how to debug programs.	<b>SE:</b> 81-82, 217
d. Optional -- Use a debugger to set break-points, and step through code to track down errors at runtime.	<b>SE:</b> 295-296
<b>STANDARD 2</b> Students will employ accepted programming methodology.	
<b>Objective 1:</b> Demonstrate the ability to use good programming style.	
a. Demonstrate how to use white space properly.	For related content, please see <b>SE:</b> 74
b. Employ proper naming conventions (such as Camel Case and Pascal Case).	<b>SE:</b> 73-75
c. Construct programs with meaningful identifiers.	<b>SE:</b> 76, 77
<b>Objective 2:</b> Follow the major steps of a Software Development Life Cycle (SDLC).	
a. Prepare specifications and requirements for computer programs.	<b>SE:</b> 77-82

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b. Design solutions using algorithms such as flow charts, pseudo code, and basic UML.	<b>SE:</b> 79, 80, 81, 82-87, 173, 189, 194
c. Implement the code for a program.	<b>SE:</b> 59, 82-87, 109-111
d. Test programs for effectiveness and completeness.	<b>SE:</b> 81-82, 217
e. Provide documentation for a program (such as internal and external documentation).	<b>SE:</b> 88-90
<b>Objective 3:</b> Identify the syntactical components of a program	
a. Identify keywords, identifiers, operators, operands, and literals	<b>SE:</b> 3, 73, 130, 171-176, 179-181
b. Identify the entry-point of a program	<b>SE:</b> 57, 59-61, 97
c. Identify statements and expressions in a program	<b>SE:</b> 130-131
d. Identify subroutines in a program	<b>SE:</b> 57, 97
<b>STANDARD 3</b> Students will properly use language-fundamental commands and operations.	
<b>Objective 1:</b> Demonstrate the ability to use basic elements of a specific language.	
a. Write programs using a language-specific template.	<b>SE:</b> 59
b. Declare, initialize, and assign values to constants and variables.	<b>SE:</b> 113-117
c. Output text with formatting.	<b>SE:</b> 139, 142-144
d. Demonstrate the ability to use input/output commands.	<b>SE:</b> 121
e. Output values stored in identifiers.	<b>SE:</b> 65
<b>Objective 2:</b> Employ basic arithmetic expressions in programs.	
a. Use basic arithmetic operators (addition, subtraction, modulus, multiplication, division)	<b>SE:</b> 130-132

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<b>Utah Core Standards for Computer Programming I</b>	<b>Starting Out with Alice A Visual Introduction to Programming 3<sup>rd</sup> Edition, ©2013</b>
b. Understand order of operation of expressions	For supporting content, please see <b>SE:</b> 130-132
c. Write expressions that mix floating-point and integer expressions.	<b>SE:</b> 193
d. Write expressions to accumulate values.	<b>SE:</b> 130-132
<b>Objective 3:</b> Demonstrate the ability to use data types in programs.	
a. Declare and use primitive data types (integer, floating point, Boolean)	<b>SE:</b> 114-115, 149-150
b. Declare and use reference (non-primitive) types	<b>SE:</b> 114-115
c. Declare and use constants.	For related content, please see <b>SE:</b> 113-117
d. Optional -- Declare and use enumerators as a list of constants	This objective falls outside the scope of this program.
<b>Objective 4:</b> Demonstrate the ability to use strings in programs.	
a. Declare string identifier.	<b>SE:</b> 138-139
b. Input string identifiers.	<b>SE:</b> 138-139
c. Output string identifiers.	<b>SE:</b> 65
<b>STANDARD 4</b> Students will properly employ control structures.	
<b>Objective 1:</b> Demonstrate the ability to use relational and logical operators in programs.	
a. Compare values using relational operators.	<b>SE:</b> 173-176, 179-181
b. Form complex expressions using logical operators.	For supporting content, please see <b>SE:</b> 171-173
<b>Objective 2:</b> Demonstrate the ability to use decisions in programs.	
a. Employ simple IF structures.	<b>SE:</b> 151-154, 158, 160-163
b. Use IF-ELSE structures.	<b>SE:</b> 151-154, 158, 160-163

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c. Write programs with nested IF-ELSE structures.	<b>SE:</b> 164-165, 166-171, 181-184
d. Make multiple-way selections (switch, case).	This objective falls outside the scope of this program.
<b>Objective 3:</b> Demonstrate the ability to use loops in programs.	
a. Use initial, terminal, and incremental values in loops.	<b>SE:</b> 185-186, 187-188
b. Construct both pre-test and post-test loops.	<b>SE:</b> 195-196, 198
c. Demonstrate how to use counted loops.	<b>SE:</b> 187-188, 189-192, 193-194
d. Describe the use of flagged (sentinel-controlled) loops.	<b>SE:</b> 197, 198-201
e. Utilize nested loops.	<b>SE:</b> 207-208, 209
f. Explain how to avoid infinite loops.	<b>SE:</b> 193
g. Accumulate running totals using loops.	For supporting content, please see <b>SE:</b> 185-187
<b>Objective 4:</b> Demonstrate the ability to use modularity in programs.	
a. Demonstrate how to use language-defined subroutines.	<b>SE:</b> 59-61, 66, 67-69
b. Develop and utilize subroutines.	<b>SE:</b> 71, 79-80, 131, 223
c. Utilize value and reference parameters.	<b>SE:</b> 61, 227-230, 231-233
d. Understand the scope of identifiers in subroutines.	<b>SE:</b> 113, 249
e. Return values from subroutines.	<b>SE:</b> 120-121, 122-125

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<b>Utah Core Standards for Computer Programming I</b>	<b>Starting Out with Alice A Visual Introduction to Programming 3<sup>rd</sup> Edition, ©2013</b>
<b>STANDARD 5</b>	
Students will demonstrate knowledge of current ethical issues dealing with computers and information in society.	
<b>Objective 1:</b> Understand ethical responsibility of software developers	
a. Explain the ethical reasons for creating reliable and robust software.	Alice is designed as a teaching tool to make programming easy to learn, rather than a system for professional application development. Therefore, this objective falls outside the scope of this program.
b. Explain the impact software can have on society.	This objective falls outside the scope of this program.
c. Show how security concerns can be addressed in a program.	This objective falls outside the scope of this program.
<b>Objective 2:</b> Demonstrate knowledge of the social and ethical consequences of computers.	
a. Describe how computer-controlled automation affects a workplace and society.	This objective falls outside the scope of this program.
b. Explain the ramifications of society's dependence on computers.	This objective falls outside the scope of this program.
c. Identify advantages and disadvantages of changing workplace environments.	This objective falls outside the scope of this program.
<b>Objective 3:</b> Demonstrate knowledge of the right to privacy.	
a. Explain how computers can compromise privacy.	This objective falls outside the scope of this program.
b. Exhibit knowledge of privacy laws.	This objective falls outside the scope of this program.
c. Describe responsibilities of people who control computer information.	This objective falls outside the scope of this program.
<b>Objective 4:</b> Demonstrate knowledge of computer, information and software security.	
a. Exhibit knowledge of copyright laws.	This objective falls outside the scope of this program.
b. Explain how computers could erroneously be used to compromise copyright laws.	This objective falls outside the scope of this program.



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<b>Utah Core Standards for Computer Programming I</b>	<b>Starting Out with Alice A Visual Introduction to Programming 3<sup>rd</sup> Edition, ©2013</b>
c. Give examples of ways to protect information on computer systems.	This objective falls outside the scope of this program.
d. Identify ways to protect against computer viruses.	This objective falls outside the scope of this program.
<b>STANDARD 6</b> Students will develop an awareness of career opportunities in the Computer Programming/ Software Engineering industry and of its history.	
<b>Objective 1:</b> Identify personal interests and abilities related to Computer Programming/Software Engineering careers	
a. Identify personal creative talents	This objective falls outside the scope of this program.
b. Identify technical/programming talents	This objective falls outside the scope of this program.
c. Identify organizational and leadership skills	This objective falls outside the scope of this program.
d. Explore aptitude for innovation	This objective falls outside the scope of this program.
e. Determine aptitude for working as a member of a Computer Programming/Software Engineering team	This objective falls outside the scope of this program.
<b>Objective 2:</b> Identify Computer Science career fields	
a. Understand the work of a Software Engineer	For related content, please see <b>SE: 77-82</b>
b. Understand what a Systems Analyst does	For related content, please see <b>SE: 77-82</b>
c. Understand the kind of work performed by a Applications Programmer (Gaming, Multimedia Etc.)	For related content, please see <b>SE: 77-82</b>

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<b>Objective 3:</b> Investigate career opportunities, trends, and requirements related to Computer Programming/Software Engineering careers	
a. Identify the members of a Computer Programming/Software Engineering team: Team Leader, Analyst, Sr. Developer, Jr. Developer, and Client/Subject Matter Expert	This objective falls outside the scope of this program.
b. Describe work performed by each member of the Computer Programming/Software Engineering team	This objective falls outside the scope of this program.
c. Investigate trends associated with Computer Programming/Software Engineering careers	This objective falls outside the scope of this program.
d. Develop a realistic Student Education Occupation Plan (SEOP) to help guide further educational pursuits	This objective falls outside the scope of this program.
<b>Objective 4:</b> Identify factors for employability and advancement in Computer Programming/Software Engineering careers	
a. Survey existing Computer Programming/Software Engineering businesses to determine what training is required	This objective falls outside the scope of this program.
b. Survey universities and colleges to determine higher education options	This objective falls outside the scope of this program.
c. Develop employability competencies/characteristics: responsibility, dependability, respect, and cooperation	This objective falls outside the scope of this program.
d. Achieve high standards of personal performance	This objective falls outside the scope of this program.
e. Develop a positive work ethic	This objective falls outside the scope of this program.
f. Compile a portfolio of the individual and group programs developed during the course	This objective falls outside the scope of this program.

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<b>Objective 5:</b> Discuss relevant history of software development	
a. Discuss relevant history of computer technology	This objective falls outside the scope of this program.
b. Identify key points in the history of the Computer Programming/Software Engineering industry	This objective falls outside the scope of this program.
<b>COMPUTER PROGRAMMING IB (SEMESTER 2)</b>	
<b>CORE STANDARDS, OBJECTIVES AND INDICATORS</b>	
<b>STANDARD 7</b>	
Students will employ arrays.	
<b>Objective 1:</b> Demonstrate the ability to use arrays in programs.	
a. Declare arrays all applicable types.	<b>SE:</b> 330-331
b. Initialize arrays.	<b>SE:</b> 331-332
c. Input data into arrays.	<b>SE:</b> 331-332
d. Output data from arrays.	For related content, please see <b>SE:</b> 336-337
e. Perform operations on arrays.	<b>SE:</b> 333-335, 338-340
f. Perform sequential searches on arrays.	<b>SE:</b> 333-335
<b>Objective 2:</b> Demonstrate the ability to use dynamic arrays (i.e. vectors, array lists, or generic lists)	
a. Declare a dynamic array	<b>SE:</b> 305
b. Add and remove items from the array	<b>SE:</b> 318-319
c. Output data from arrays.	<b>SE:</b> 320
d. Perform operations on arrays.	<b>SE:</b> 307-312, 313-317
e. Iterate through the loop (i.e. for each loop)	<b>SE:</b> 313-318, 320
<b>Objective 3:</b> Demonstrate the ability to use strings in programs.	
a. Compare string identifiers.	For supporting content, please see <b>SE:</b> 138-140

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b. Find the length of a string.	For supporting content, please see <b>SE:</b> 138-140
c. Copy part or all of string identifiers into other strings.	For supporting content, please see <b>SE:</b> 138-140
d. Concatenate string identifiers.	<b>SE:</b> 139-140
e. Locate and delete sub-string positions.	For supporting content, please see: <b>SE:</b> 138-140
f. Insert strings into other strings.	For supporting content, please see: <b>SE:</b> 138-140
<b>STANDARD 8</b>	
Students will properly employ object-oriented programming techniques.	
<b>Objective 1:</b> Demonstrate the ability to use classes.	
a. Instantiate objects.	<b>SE:</b> 13-16, 19-30, 54-56
b. Use object data members.	<b>SE:</b> 13, 233-234
c. Use object member functions (methods).	<b>SE:</b> 14, 214-216
<b>Objective 2:</b> Demonstrate the ability to create user-defined classes.	
a. Create and use data members.	<b>SE:</b> 233-234, 235-237
b. Create a constructor to initialize the data members.	This objective falls outside the scope of this program.
c. Create and use instance functions (methods).	<b>SE:</b> 238-241, 243-248
<b>Objective 3:</b> Demonstrate proper design principles with classes	
a. Create classes that are well encapsulated (data members private).	This objective falls outside the scope of this program.
b. Properly use modifiers and accessors (getters and setters).	This objective falls outside the scope of this program.
c. Understand private and public modifiers	This objective falls outside the scope of this program.

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<b>STANDARD 9</b> Students will properly use sequential files.	
<b>Objective 1:</b> Demonstrate the ability to use sequential files in programs.	
a. Create and initialize sequential files.	This objective falls outside the scope of this program.
b. Store data to sequential files.	This objective falls outside the scope of this program.
c. Retrieve data from sequential files.	This objective falls outside the scope of this program.
d. Update sequential files.	This objective falls outside the scope of this program.
<b>STANDARD 10</b> Students will apply appropriate programming skill as an effective member of a team.	
<b>Objective 1:</b> Demonstrate the ability to apply knowledge to a programming project.	
a. Formalize specifications.	<b>SE:</b> 77-82
b. Choose proper input parameters.	<b>SE:</b> 77-82
c. Choose appropriate data structures and processing.	<b>SE:</b> 77-82, 303-304
d. Design appropriate output.	<b>SE:</b> 77-82
e. Use appropriate test data.	<b>SE:</b> 77-82
f. Write good documentation.	<b>SE:</b> 77-82, 88-89
<b>Objective 2:</b> Demonstrate the ability to use teamwork and collaboration in a programming project.	
a. Divide a project among programmers.	This objective falls outside the scope of this program.
b. Present work to a group.	This objective falls outside the scope of this program.
c. Coordinate work with others in the group.	This objective falls outside the scope of this program.

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d. Complete assigned work according to predetermined deadlines.	This objective falls outside the scope of this program.
e. Participate in a peer performance evaluation.	This objective falls outside the scope of this program.
f. Demonstrate professionalism in team relationships, communication, timeliness, and attitude.	This objective falls outside the scope of this program.