

BERKELEY HEIGHTS PUBLIC SCHOOLS
BERKELEY HEIGHTS, NEW JERSEY

**GOVERNOR LIVINGSTON HIGH SCHOOL
MATHEMATICS DEPARTMENT**

COMPUTER SCIENCE 2
#0328

Curriculum Guide

October 2004

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This curriculum may be modified through varying techniques,
strategies, and materials, as per an individual student's
Individualized Educational Plan (IEP).

Approved by the Berkeley Heights Board of Education
at the regular meeting held on 10/14/04.

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PHILOSOPHY/RATIONALE

Computer Science 2 is a one-semester course in programming using the Visual Basic 6.0 programming language. Students will develop skills in problem solving, critical thinking, and effective communication. Creativity and independence are important aspects to functioning successfully in this course.

Computer Science 2 is the second component of a comprehensive sequence of computer programming courses. Applications are provided in the areas of mathematics, probability and statistics, business, industry, and education. During the course students will learn advanced features of the Visual Basic language. This is achieved through a wide variety of lessons and programs.

The prerequisite for Computer Science 2 is Computer Science 1. Upon successful completion of the course the student will earn 2.5 credits. This course is intended for students in grades 9-12. The New Jersey Core Curriculum Content Standards for Mathematics, Technological Literacy, and Career Education and Consumer, Family, and Life Skills have been integrated throughout the curriculum.

COURSE PROFICIENCIES

COURSE OBJECTIVES

1. To give students the opportunity to learn advanced programming techniques using Visual Basic 6.0. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2, B3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
2. To introduce students to the fundamental concepts of object oriented programming. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2, B3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
3. To continue the development of the students' problem solving and critical thinking skills. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2, B3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3, 5,6; 9.1/B3; 9.2/A1)
4. To develop the students' ability to apply new learning to a wide variety of practical problems. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2, B3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
5. To enable students to recognize the close relationship between mathematics and computer programming. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2, B3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2, 10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
6. To demonstrate the impact computer programming has on all aspects of life. (4.3/C1; 4.4/A2, B3; 4.5/A2, C3,4; 9.1/B3; 9.2/A1)
7. To encourage students to use computers and computer programming in an ethical manner. (8.1/B2)

STUDENT PROFICIENCIES

The student will be able to:

1. Design and code projects that utilize multiple forms. (4.2/A4; 4.3/A3, D3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
2. Declare and use global variables and constants. (4.2/A4; 4.3/A3, D3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
3. Understand and apply string functions. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
4. Use loops in concert with string functions to perform traversal and search operations on strings. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
5. Print information to the printer using the *Print* method. (4.3/D3; 4.4/A2; 4.5/A2,3,5, B1,2,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
6. Create and effectively use a control array. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2, B3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
7. Declare and effectively use a one-dimensional array. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2, B3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
8. Use loops to perform traversal, sort, and search operations on one-dimensional arrays. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
9. Use the *Type* statement to group related information together. (4.3/C1; 4.5/A2,3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
10. Declare and effectively use a two dimensional array. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2, B3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
11. Use nested loops to perform traversal, sort, and search operations on two-dimensional arrays. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
12. Understand the concepts of encapsulation, polymorphism, and inheritance as they relate to object oriented programming. (4.3/A3, C1; 4.4/A2; 4.5/A2,3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)

STUDENT PROFICIENCIES (continued)

13. Design a class, add properties to the class, and, effectively use objects of the class type in a program. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2, B3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
14. Create, open, and close a data file. (4.3/C1, D3; 4.5/A2,3,5; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
15. Read information from a data file, write information to a data file, and append information at the end of a data file. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2, B3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
16. Use drag and drop techniques to drag a source object and drop it onto a target object. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
17. Drag multiple source objects to the same target object. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
18. Use animation techniques to move multiple objects simultaneously and detect when moving objects collide. (4.2/A4; 4.3/A3, C1, D3; 4.4/A2, B3; 4.5/A1-3,5, B1-4, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)

METHODS OF EVALUATION

1. Tests.
2. Quizzes.
3. Individual projects.
4. Group projects.
5. Written homework.
6. Final exam.

SCOPE AND SEQUENCE
COURSE OUTLINE/STUDENT OBJECTIVES

The student will be able to:

N. J. Core Curriculum Standards	Indicators	Course Outline/Student Objectives *(see note at end of outline)
4.2 4.3 4.5 8.1 8.2 9.1 9.2	A4 A3 D3 A1,2,3,5 B1,2,3,4 C3,4 D2,3,4 B2,10,11 B3,5,6 B3 A1	I. Multiple Forms A. Create a Project With Multiple Forms 1. Splash screens 2. About forms 3. Modal forms 4. Modeless forms B. Declare and Use Global Variables and Constants C. Refer to Objects on Different Forms D. Designate a Form as the Startup Form E. Use the Load Statement to Put a Form Into Memory F. Use the UnLoad Statement to Take a Form Out of Memory G. Use the Hide and Show Methods H. Create a Program That Uses Sub Main as the Startup Object
4.2 4.3 4.4 4.5 8.1 8.2 9.1 9.2	A4 A3 C1 D3 A2 A1,2,3,5 B1,2,3,4 C3,4 D2,3,4 B2,10,11 B3,5,6 B3 A1	II. Strings A. Understand and Apply Various String Functions 1. Left function 2. Right function 3. Mid function 4. Len function B. Use Loops and String Functions to Traverse Through the Characters of a String C. Search a String for a Substring
4.3 4.4 4.5 8.1 8.2 9.1 9.2	D3 A2 A2,3,5 B1,2,4 D2,3,4 B2,10,11 B3,5,6 B3 A1	III. Printing to a Printer A. Send Information to the Printer Using the Print Method B. Format Output to be Printed 1. Commas and semicolons 2. Spc function 3. Tab function 4. Format functions C. Use the EndDoc and NewPage Methods to Control Printing

4.2	A4	<p>IV. One Dimensional Arrays</p> <p>A. Create and Effectively Use a Control Array</p> <p>B. Declare and Effectively Use a One Dimensional Variable Array</p> <p>C. Use a Loop to Traverse an Array</p> <p>D. Sort an Array</p> <p>E. Search an Array for a Given Value</p> <p>F. Use the Type Statement to Group Related Information in One Object</p> <p>G. Declare and Effectively Use an Array of User Defined Types</p>	
4.3	A3		
	C1		
	D3		
4.4	A2		
	B3		
4.5	A1,2,3,5		
	B1,2,3,4		
	C3,4		
	D2,3,4		
8.1	B2,10,11	<p>V. Two Dimensional Arrays</p> <p>A. Declare and Effectively Use a Two Dimensional Array</p> <p>B. Use Nested Loops to Traverse and Process the Information in the Array</p> <p>C. Sum a Two Dimensional Table</p>	
8.2	B3,5,6		
9.1	B3		
9.2	A1		
4.2	A4		
4.3	A3		
	C1		
	D3		
4.4	A2		
	B3		
4.5	A1,2,3,5	<p>VI. Object Oriented Programming (OOP)</p> <p>A. Define OOP Terminology</p> <ol style="list-style-type: none"> 1. Encapsulation 2. Polymorphism 3. Inheritance <p>B. Employ Reusable Objects</p> <p>C. Design a Class</p> <ol style="list-style-type: none"> 1. Set Property Let procedure 2. Use the Property Get procedure 3. Establish and add property procedures <p>D. Declare an Object Using a Class and Use the Object in a Program</p> <p>E. Use Arrays of Objects</p>	
	B1,2,3,4		
	C3,4		
	D2,3,4		
8.1	B2,10,11		
8.2	B3,5,6		
9.1	B3		
9.2	A1		
4.2	A4		<p>VII. Data Files</p> <p>A. Create a Data File</p> <p>B. Open and Close Data Files</p> <p>C. Read Information From a Data File</p> <p>D. Write Information to a Data File</p>
4.3	A3		
	C1		
	D3		
4.4	A2		

4.5	B3 A1,2,3,5 B1,2,3,4 C3,4 D2,3,4	VII. Data Files E. Append Information to the End of a Data File F. Use Data Files in Conjunction With Arrays G. Work with Multiple Data Files Simultaneously
8.1	B2,10,11	
8.2	B3,5,6	
9.1	B3	
9.2	A1	
4.2	A4	VIII. Drag and Drop
4.3	A3 C1 D3	A. Move a Source Object B. Employ a Target Object C. Create DragOver and DragDrop Events D. Set The DragMode and DragIcon Properties E. Drag Multiple Source Objects to the Same Target
4.4	A2	
4.5	A1,2,3,5 B1,2,3,4 C3,4 D2,3,4	
8.1	B2,10,11	
8.2	B3,5,6	
9.1	B3	
9.2	A1	
4.2	A4	XI. Animation
4.3	A3 C1 D3	A. Review the Fundamentals of Computer Animation B. Move Multiple Objects Simultaneously C. Detect When Two Objects Collide
4.4	A2 B3	
4.5	A1,2,3,5 B1,2,3,4 C3,4 D2,3,4	
8.1	B2,10,11	
8.2	B3,5,6	
9.1	B3	
9.2	A1	

Note: The New Jersey Core Curriculum Standards can be accessed at www.state.nj.us

RESOURCES/ACTIVITIES GUIDE

Web sites:

<http://msdn.microsoft.com/vbasic/>

Microsoft's Visual Basic Developer Center.

<http://www.hitmill.com/programming/vb.htm>

Contains Visual Basic information including background information, tutorials, code, and examples.

<http://www.vbwm.com/>

Visual Basic Web Magazine Homepage

A monthly Internet magazine devoted to Visual Basic programming.

<http://www.vbexplorer.com>

Visual Basic Explorer Homepage

Contains Visual Basic information including background information, tutorials, code, and examples.

SUGGESTED AUDIO VISUAL/COMPUTER AIDS

1. Proxima LCD Projector.
2. Microsoft PowerPoint Software.
3. Microsoft Word Software.
4. Microsoft Internet Explorer Software.

SUGGESTED MATERIALS

Resources for Students

Text:

Bradley and Millspaugh. Programming in Visual Basic 6.0. Irwin McGraw-Hill, 1999.

Software:

Visual Basic 6.0 Professional

Microsoft

Visual Basic 6.0 is an integrated development environment that is used to make graphical user interface programs for Microsoft Windows.

Visual Basic 6.0 Working Model

Microsoft

The Visual Basic 6.0 Working Model is a program provided with the textbook for students to install at home so they can work on their assignments.

Website:

http://www.mhhe.com/cit/program/bradley6/index_old.html

This is the textbook's companion web site that contains both student and teacher resources.

Resources for Teacher

Text:

Bradley and Millspaugh. Programming in Visual Basic 6.0. Irwin McGraw-Hill, 1999.

Software:

Bradley and Millspaugh

Instructor's CD for Programming in Visual Basic 6.0

Irwin McGraw-Hill

1999

Visual Basic 6.0 Professional

Microsoft

Visual Basic 6.0 is an integrated development environment that is used to make graphical user interface programs for Microsoft Windows.

Supplemental Materials:

Deitel, Deitel, and Nieto. Visual Basic 6.0: How to Program. Prentice Hall, 1999.

Website:

http://www.mhhe.com/cit/program/bradley6/index_old.html

This is the textbook's companion web site that contains both student and teacher resources.