

BERKELEY HEIGHTS PUBLIC SCHOOLS
BERKELEY HEIGHTS, NEW JERSEY

**GOVERNOR LIVINGSTON HIGH SCHOOL
MATHEMATICS DEPARTMENT**

COMPUTER SCIENCE 1
#0326

Curriculum Guide

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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 1 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 1 provides a comprehensive introduction to computer programming in a structured language with applications provided in the areas of mathematics, probability and statistics, business, industry, and education. This course is the prerequisite for all other computer programming courses. During the course students will learn different features and capabilities of the Visual Basic language through a wide variety of lessons and programs.

The prerequisite for Computer Science 1 is Algebra 1 (which also may be taken concurrently). 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 provide students with general information about computers and programming. (4.5/C3; 8.1/B1,2,4; 8.2/A2)
2. To give students the opportunity to learn structured 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)
3. To build 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 what they have learned 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. List the hardware components of a computer. (8.1/B1,4)
2. Distinguish between various types of high level programming languages. (4.5/C3, 8.1/B1,4; 8.2/A2)
3. Use computers in an ethical manner. (8.1/B2)
4. Create, set-up, save, and load a project in Visual Basic 6.0. (4.3/D3; 4.4/A2; 4.5/A1-3,5, D3,4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
5. Add controls to a form and use them effectively. (4.3/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)
6. Set properties of an object during both design time and run time. (4.3/ 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)
7. Create and code events procedures for various objects. (4.3/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)
8. Declare variables and constants of various data types and use them effectively in programs. (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. Determine the scope and lifetime of all variables and constants used in a program. (4.3/C1; 4.4/A2; 4.5/A1-3,5, C3,4, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
10. Perform arithmetic operations on variables and also use variables in functions built in to 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)
11. Use simple and complex *if* structures to make decisions in programs. (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)
12. Create and modify a menu. (4.3/C1; 4.5/A1-3,5, D2-4; 8.1/B2,10,11; 8.2/B3,5,6; 9.1/B3; 9.2/A1)
13. Make effective use of programmer defined procedures and functions. (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)

STUDENT PROFICIENCIES (continued)

14. Use *do..while*, *do..until*, and *for..next* structures to loop code. (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)
15. Create and manipulate list and combo boxes. (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. Generate sequences of random numbers to simulate real life situations. (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)
17. Understand the fundamental concepts of computer animation and write code that will move an object. (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)
18. Use timers and scroll bars to control animation. (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)

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)
4.5 8.1 8.2	C3 B1,2,4 A2	I. Introduction to Computers A. List the Hardware Components of a Computer 1. CPU 2. Memory 3. Secondary storage devices 4. Input and output devices B. Distinguish Between Various Types of High Level Programming Languages 1. Procedural 2. Object oriented 3. Event driven C. Demonstrate an Understanding of the Programming Process 1. Analyze the problem 2. Write the code 3. Test and debug the program D. Use Computers in an Ethical Manner
4.3 4.4 4.5 8.1 8.2 9.1 9.2	D3 A2 A1,2,3,5 D3,4 B2,10,11 B3,5,6 B3 A1	II. Introduction to Visual Basic A. Become Familiar With the Visual Basic IDE 1. Menu bar 2. Toolbar 3. Toolbox 4. Properties window 5. Form window 6. Project explorer window 7. Form layout window B. Create a Project in Visual Basic 1. Setup and resize forms 2. Add controls to a form 3. Set properties of controls and forms 4. Document the program 5. Save a project 6. Open a previously saved project
4.2 4.3 4.5	A4 A3 C1 D3 A1,2,3,5	III. Using Controls A. Understand the Purpose of the Fundamental Visual Basic Controls and Use Them Effectively in a Program 1. Command button 2. Label

<p>8.1 8.2 9.1 9.2</p>	<p>B1,2,3,4 C3,4 D2,3,4 B2,10,11 B3,5,6 B3 A1</p>	<p>III. Using Controls (continued)</p> <ol style="list-style-type: none"> 3. Text box 4. Check box 5. Option button 6. Frame 7. Image 8. Shape 9. Line <p>B. Set Various Properties of Controls</p> <ol style="list-style-type: none"> 1. Caption 2. Name 3. Height 4. Width 5. Border style 6. Fore color 7. Back color 8. Value 9. Tool tip text 10. Visible 11. Alignment <p>C. Create and Code Click Event Procedures</p> <p>D. Understand the Concept of an Object Having Focus</p> <p>E. Set the Tab Order for Controls on a Form</p> <p>F. Define Access Keys</p> <p>G. Use an Assignment Statement to Change Properties During Runtime</p> <p>H. Use a With...End With Block to Change Multiple Properties Simultaneously</p>
<p>4.2 4.3 4.4 4.5 8.1 8.2 9.1 9.2</p>	<p>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</p>	<p>IV. Data Types</p> <p>A. List Fundamental Data Types of Visual Basic and Understand the Type of Value Each Can Hold</p> <ol style="list-style-type: none"> 1. Integer 2. Long 3. Single 4. Double 5. Currency 6. Boolean 7. String 8. Variant <p>B. Declare Both Variables and Constants of Various Data Types</p> <p>C. Understand the Distinction Between a Variable and Constant and Use Each Appropriate Situations</p> <p>D. Follow Proper Guidelines When Naming Variables and Constants</p> <p>E. Understand the Concept of Scope and Identify the Scope</p>

		<p>IV. Data Types (continued) of Variables and Constants Used</p> <ol style="list-style-type: none"> 1. Local 2. Module level <p>F. Understand and Identify the Lifetime of a Variable</p>
<p>4.2 4.3 4.4 4.5 8.1 8.2 9.1 9.2</p>	<p>A4 A3 C1 D3 A2 B3 A1,2,3,5 B1,2,3,4 C3,4 D2,3,4 B2,10,11 B3,5,6 B3 A1</p>	<p>V. Operations</p> <ol style="list-style-type: none"> A. Perform Arithmetic Operations on Variables of All Types <ol style="list-style-type: none"> 1. Addition 2. Subtraction 3. Multiplication 4. Division 5. Exponentiation 6. Integer division 7. Modulus B. Explain the Order of Operations C. Use the Assignment Operator to Assign Values to Variables <ol style="list-style-type: none"> 1. Analyze the problem 2. Write the code 3. Test and debug the program D. Use Counter and Accumulator Variables E. Use Visual Basic Functions <ol style="list-style-type: none"> 1. Int 2. Sqr 3. Val 4. Format currency 5. Format number
<p>4.2 4.3 4.4 4.5 8.1 8.2 9.1 9.2</p>	<p>A4 A3 C1 D3 A2 B3 A1,2,3,5 B1,2,3,4 C3,4 D2,3,4 B2,10,11 B3,5,6 B3 A1</p>	<p>VI. Decision and Conditions</p> <ol style="list-style-type: none"> A. Write a Simple If Statement B. Write a Simple If-Else Statement C. Write If and If-Else Statement Blocks D. Create and Apply Nested If/If-Else Structures E. Use Relational Operators (<, >, <=, >=, <>, =) F. Use the Logical Operators <i>And</i>, <i>Or</i>, and <i>Not</i> to Create More Sophisticated Conditions G. Apply If Structures Option Buttons and Check Boxes H. Use If Structures to Validate Input I. Use Functions in If Structures J. IsNumeric K. UCase L. LCase
<p>4.2 4.3</p>	<p>A4 A3 C1 D3</p>	<p>VII. Procedures and Functions</p> <ol style="list-style-type: none"> A. Define and Modify a Menu B. Use a Common Dialog Control C. Write User-Defined Functions and Procedures

4.4	A2	<p>VII. Procedures and Functions (continued)</p> <p>A. Understand the Difference Between a Procedure and a Function and Make Appropriate Use of Each</p> <p>B. Pass ByRef and ByVal Arguments to Procedures and Functions</p> <p>C. Understand the Distinction Between ByVal and ByRef Arguments</p> <p>D. Call Procedures and Functions</p> <p>E. Reuse Procedures and Functions</p>
4.5	B3	
	A1,2,3,5	
	B1,2,3,4	
	C3,4	
	D2,3,4	
8.1	B2,10,11	<p>VIII. Loops</p> <p>A. Design and Apply FOR...NEXT Loops</p> <p>B. Design and Apply Do...While and Do...Until Loops</p> <p>C. Understand the Difference Between Counter Controlled Loops and Condition Controlled Loops</p> <p>D. Determine What Type of Loop is Most Appropriate in Various Situations</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	
	B1,2,3,4	
	C3,4	
	D2,3,4	
8.1	B2,10,11	<p>IX. Lists</p> <p>A. Create a List Box and Manipulate the Items in the List During Both Design-Time and Runtime</p> <p>B. Create a Combo Box and Manipulate the Items in the List During Both Design-Time and Runtime</p> <p>C. Understand the Distinction Between a List Box and Combo Box</p> <p>D. Set and Use Properties of List and Combo Boxes</p> <ol style="list-style-type: none"> 1. List Index 2. List Count 3. Text <p>E. Use the AddItem Method</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	
	B1,2,3,4	
	C3,4	
	D2,3,4	
8.1	B2,10,11	<p>X. Random Numbers</p> <p>A. Understand the Concept of Pseudorandom Numbers</p> <p>B. Use the RND Function to Generate Random Numbers</p> <p>C. Generate a Sequence of Random Integers Within a Specified Range</p> <p>D. Generate a Sequence of Random Real Numbers Within a Specified Range</p> <p>E. Use Random Numbers to Simulate Real Life Situations</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	
	B1,2,3,4	

8.1 8.2 9.1 9.2	C3,4 D2,3,4 B2,10,11 B3,5,6 B3 A1	X. Random Numbers (continued) F. Use the Randomize Statement
4.2 4.3 4.4 4.5 8.1 8.2 9.1 9.2	A4 A3 C1 D3 A2 B3 A1,2,3,5 B1,2,3,4 C3,4 D2,3,4 B2,10,11 B3,5,6 B3 A1	XI. Animation A. Understand the Fundamental Concepts of Computer Animation B. Move Objects Vertically, Horizontally, and Diagonally C. Use Timers to Control Animation D. Use Scroll Bars to Control Animation

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

RESOURCES/ACTIVITES 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.