Everett School District Framework: Computer Science 2 - Java / AP Computer Science

Course: Computer Programming	**Total Framework Hours:** 180 Hours
CIP Code: 110201	**Type:** Preparatory
Career Cluster: Information Technology	**Date Last Modified:** Monday, December 16, 2013

Resources and Standard used in Framework Development:

Standards used in this framework come from the OSPI Model Framework for 110201 Computer Programming

Unit 1 JAVA BASICS — Hours: 5

Performance Assessment(s):

Formative - Career exploration of Software Engineering, students will explore jobs currently posted for software engineers and identify skills, education, job related requirements and salary. As well as identify varieties of options by looking at inspiring individuals in the field [Randy Pausch]
Formative - students will complete NetBeans tutorial
Formative - After a classroom presentation and discussion students will complete an investigation of the Basic elements of Java, objects, classes, byte code, java coding standards.
Formative- Hello World
Summative - School Song - by creating a class that outputs the school song using println statements

Leadership Alignment:

Leadership 3.0 Community and Career Skills
3.1 The student will analyze the roles and responsibilities of citizenship.
TSA - Computer Programming Task
FIRST Robotics - Computer Programming of Robot Control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Computer Programming Theory
- Describe the relationship between hardware and software.
- Analyze programming languages for uses, structure, and environment.
- Classify the various programming languages by communication level.
- Summarize the function and operation of compilers and interpreters.
- List the stages of program development.
- Analyze a problem identifying desired outputs for given inputs.
- Identify the use of program design tools.
- Explain structured/modular programming.
- Describe the information system (IS) life cycle.

Standard: Computing and Society

- Discuss ethical and unethical uses of computing technology
- Describe emerging technologies and their anticipated impact

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

3 - Construct viable arguments and critique the reasoning of others.

4 - Model with mathematics.

5 - Use appropriate tools strategically.

6 - Attend to precision.

7 - Look for and make use of structure.

8 - Look for and express regularity in repeated reasoning.

Reading

Science

Social Studies

Writing

CC: Writing (11-12)

2 - Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

2a - Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

2b - Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

2c - Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.

2d - Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.

2e - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

2f - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [x] Work Creatively with Others
- [ ] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [x] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [x] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy
- [ ] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [x] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [ ] Adapt to Change
- [ ] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [ ] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [x] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [x] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 2 COMPUTER SCIENCE AND OBJECTS | Hours: 5

Performance Assessment(s):

Formative - After class discussion and instructor presentation students will complete a questionaire about classification of copyright issues, laws.
Summative - Students will complete all 3 sections of the
http://library.thinkquest.org/26658/teacher-info.html
and present a certificate on Computer Ethics

Leadership Alignment:

TSA- Computer Programming
FIRST Robotics - Leadership

Standards and Competencies

Standard: Computing and Society

- Analyze the influence of computing technologies on culture and commerce
- Discuss ethical and unethical uses of computing technology
- Describe emerging technologies and their anticipated impact
- Explain the pros and cons of hacking and cracking

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Mathematics

Reading

CC: College and Career Readiness Anchor Standards for Reading

Key Ideas and Details

1 - Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

2 - Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

3 - Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

4 - Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

5 - Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.

6 - Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7 - Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

8 - Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

9 - Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

10 - Read and comprehend complex literary and informational texts independently and proficiently.

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation

- [x] Think Creatively
- [x] Work Creatively with Others
- [ ] Implement Innovations

Creative Thinking and Problem Solving

- [x] Reason Effectively
- [ ] Use Systems Thinking
- [x] Make Judgements and Decisions
- [ ] Solve Problems

Communication and Collaboration

- [x] Communicate Clearly
- [x] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy

- [x] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy

- [x] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)

- [ ] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability

- [ ] Adapt to Change
- [ ] Be Flexible

Initiative and Self-Direction

- [x] Mange Goals and Time
- [x] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural

- [ ] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability

- [ ] Manage Projects
- [ ] Produce Results

Leadership and Responsibility

- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 3 VARIABLE TYPES, INPUT AND OUTPUT UNIT 3 METHODS, GRAPHICS | Hours: 10

Performance Assessment(s):

Students will complete worksheets to demonstrate understaning and classification of memory allocation and for the different variable types
Formative - Students will complete the Doodle project where they will draw a simple design using the drawing planel class.
Summative - Students will demonstrate understanding of the Scanner class and output methods by completing the Verses Project.
Summative - Students will create a Picasso project where they will create an object that uses at least 3 of the Drawing Panel methods and has at least 3 methods called to draw their design.
Summative - Quiz over concepts

Leadership Alignment:

TSA - Computer Programming
FIRST Robotics - Programming of Robot Control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Project Management
- Define scope of work to achieve individual and group goals.
- Develop work breakdown structures.
- Evaluate project requirements.
- Identify required resources and budget.
- Formulate a task strategy.
- Prioritize tasks according to customer needs.
- Devise plan of action.

Standard: Computer Programming Theory
- Analyze a problem identifying desired outputs for given inputs.
- Design program logic using graphical techniques (flow charts).
- Design program logic using pseudo code techniques.

Standard: Plan Programs
- Develop a problem statement.
- Define the assumptions that define the scope of the problem.
- List strategies used to gather known information.
- Apply known information to the problem statement.
- Hypothesize expected output.
- Evaluate the viability of proposed solutions.

Standard: Develop Programs
- Develop programs using desired language.
- Develop programs that use arithmetic operations.

- Develop programs that use relational operators.
- Explain and apply the use of logical operators.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Conventions of Standard English (9-10)

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

1a - Use parallel structure.*

1b - Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.

2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

2a - Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.

2b - Use a colon to introduce a list or quotation.

2c - Spell correctly.

Conventions of Standard English (11-12)

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

1a - Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested.

1b - Resolve issues of complex or contested usage, consulting references (e.g., Merriam-Webster's Dictionary of English Usage, Garner's Modern American English) as needed.

2a - Observe hyphenation conventions.

2b - Spell correctly.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

3 - Construct viable arguments and critique the reasoning of others.

4 - Model with mathematics.

5 - Use appropriate tools strategically.

6 - Attend to precision.

7 - Look for and make use of structure.

8 - Look for and express regularity in repeated reasoning.

Reading
Science
Social Studies
Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [ ] Work Creatively with Others
- [x] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [ ] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [ ] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy
- [x] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [x] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [ ] Adapt to Change
- [x] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [x] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [ ] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 4 BASIC DECISIONS, MORE ON STRINGS, ITERATION UNIT 4 LOOPS (FOR , WHILE, DO-WHILE) | Hours: 15

Performance Assessment(s):

Formative - after instructor introduction and discussion student will correctly classify and implement mathematical formulas and Math class methods by completing worksheets
Formative - Students will complete a Temperature conversion class which will input a temperature in celsius and output a temperature in Farhenheit.
Summative - Students will modify the Temperature conversion class to include a menu that takes input and does calculations based on the user selected choice.
Summative - Quiz over concepts

Leadership Alignment:

TSA - Computer Programming
FIRST Robotics - Programming robot control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Define purpose and use of flowcharting and pseudo code

Standard: Project Management
- Identify stakeholders and decision makers.
- Develop work breakdown structures.
- Evaluate project requirements.
- Identify required resources and budget.
- Develop initial project management flow chart.
- Identify interdependencies within a project management plan.
- Identify and track critical milestones.
- Develop method of evaluation.
- Formulate a task strategy.
- Prioritize tasks according to customer needs.
- Devise plan of action.

Standard: Computer Programming Theory
- Analyze a problem identifying desired outputs for given inputs.
- Describe the fundamental data types and their operations (including arrays).
- Design program logic using graphical techniques (flow charts).
- Design program logic using pseudo code techniques.
- Identify the use of program design tools.
- Illustrate characteristics of technical documentation associated with software development.

Standard: Plan Programs
- Develop a problem statement.
- Define the assumptions that define the scope of the problem.
- Apply known information to the problem statement.

Standard: Develop Programs
- Develop programs using desired language.

- Develop programs that use arithmetic operations.
- Develop programs that use relational operators.
- Explain and apply the use of logical operators.
- Explain and apply compound conditions.
- Explain and apply control breaks.
- Explain and apply methods of calculating subtotals and final totals.
- Explain and apply iterative and conditional loops.
- Explain and apply appropriate methods of memory management.
- Develop interactive programs.
- Explain and apply the use of appropriate data structures, which may include arrays, linked lists, queues, and stacks.
- Apply language specific programming techniques.
- Test and run a program for desired output.
- Explain and apply methods used to debug a program.
- Utilize reference materials for problem solving.
- Provide internal documentation.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Conventions of Standard English (9-10)

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

1a - Use parallel structure.*

1b - Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.

2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

2a - Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.

2b - Use a colon to introduce a list or quotation.

2c - Spell correctly.

Knowledge of Language (9-10)

3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

3a - Write and edit work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's Manual for Writers) appropriate for the discipline and writing type.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

3 - Construct viable arguments and critique the reasoning of others.

4 - Model with mathematics.
5 - Use appropriate tools strategically.
6 - Attend to precision.
7 - Look for and make use of structure.
8 - Look for and express regularity in repeated reasoning.

Reading

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [x] Work Creatively with Others
- [x] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [ ] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [x] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy
- [ ] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [x] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [x] Adapt to Change
- [x] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [ ] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [ ] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 5 BOOLEAN ALGEBRA / DO WHILE, UNIT 5 ITERATION, NESTED LOOPS, SCANNER STRING, SC | Hours: 20

Performance Assessment(s):

Formative - After instructor introduction and class discussion students will complete worksheets where they complete segments of code and predict output from a code segment
Formative students will complete the Odd or Even Lab
Formative students will complete the Greatest Common Divisor Lab
Formative students will complete the Reverse String Lab
Fomrative students will complete Example program analysis and modification
Formative - students will complete the Guessing Game Lab
Summative - Students will complete the Geometry Shapes Project
Summative - Quiz over concepts

Leadership Alignment:

TSA - Computer Programming
FIRST Robotics - Program Robot Control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Project Management
- Define scope of work to achieve individual and group goals.
- Identify stakeholders and decision makers.
- Develop work breakdown structures.
- Evaluate project requirements.
- Develop initial project management flow chart.
- Formulate a task strategy.
- Prioritize tasks according to customer needs.
- Devise plan of action.

Standard: Plan Programs
- Develop a problem statement.
- Define the assumptions that define the scope of the problem.
- List strategies used to gather known information.
- Apply known information to the problem statement.
- Hypothesize expected output.
- Evaluate the viability of proposed solutions.

Standard: Develop Programs
- Develop programs using desired language.
- Develop programs that use arithmetic operations.
- Develop programs that use relational operators.

- Explain and apply the use of logical operators.
- Explain and apply compound conditions.
- Explain and apply control breaks.
- Explain and apply methods of calculating subtotals and final totals.
- Develop interactive programs.
- Explain and apply the use of appropriate data structures, which may include arrays, linked lists, queues, and stacks.
- Instantiate objects.
- Create user-defined functions.
- Test and run a program for desired output.
- Explain and apply methods used to debug a program.
- Provide internal documentation.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Conventions of Standard English (9-10)

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

1a - Use parallel structure.*

1b - Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.

2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

2a - Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.

2b - Use a colon to introduce a list or quotation.

2c - Spell correctly.

Knowledge of Language (9-10)

3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

3a - Write and edit work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's Manual for Writers) appropriate for the discipline and writing type.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

3 - Construct viable arguments and critique the reasoning of others.

4 - Model with mathematics.

5 - Use appropriate tools strategically.

6 - Attend to precision.

7 - Look for and make use of structure.

8 - Look for and express regularity in repeated reasoning.

Reading

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [x] Work Creatively with Others
- [x] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [x] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [x] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy
- [ ] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [x] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [x] Adapt to Change
- [ ] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [x] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [ ] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 6 ONE DIMENSIONAL ARRAYS | Hours: 10

Performance Assessment(s):

Formative - After instructor introduction and class discussion students will complete worksheets where they complete segments of code and predict output from a code segment
Formative - Word Sorter Lab
Formative - Fibonnaci Lab
Summative - Histogram Project
Summative - Quiz over concepts

Leadership Alignment:

TSA- Computer Programming
FIRST Robotics - Programming Robot Control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Computer Programming Theory
- Design program logic using graphical techniques (flow charts).
- Design program logic using pseudo code techniques.
- Illustrate characteristics of technical documentation associated with software development.

Standard: Plan Programs
- Develop a problem statement.
- Define the assumptions that define the scope of the problem.
- List strategies used to gather known information.
- Apply known information to the problem statement.
- Hypothesize expected output.
- Evaluate the viability of proposed solutions.

Standard: Develop Programs
- Develop programs that use arithmetic operations.
- Develop programs that use relational operators.
- Explain and apply the use of logical operators.
- Explain and apply compound conditions.
- Explain and apply control breaks.
- Explain and apply methods of calculating subtotals and final totals.
- Explain and apply iterative and conditional loops.
- Describe common development environments.
- Design and develop classes, subclasses.
- Instantiate objects.
- Explain and apply methods of incorporating error handling routines.

- Define and apply built-in functions.
- Create user-defined functions.
- Provide internal documentation.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Conventions of Standard English (9-10)

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

1a - Use parallel structure.*

1b - Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.

2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

2a - Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.

2b - Use a colon to introduce a list or quotation.

2c - Spell correctly.

Knowledge of Language (9-10)

3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

3a - Write and edit work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's Manual for Writers) appropriate for the discipline and writing type.

Mathematics

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Reading

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [x] Work Creatively with Others
- [x] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [ ] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [x] Access and Evaluate Information
- [ ] Use and Manage Information

Media Literacy
- [x] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [x] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [ ] Adapt to Change
- [x] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [x] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [ ] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 7 SORTING AND SEARCHING INTRODUCTION | Hours: 15

Performance Assessment(s):

Formative - After instructor introduction and class discussion students will complete worksheets where they complete segments of code and predict output from a code segment
Summative - Sort a list of words project
Summative - Quiz over concepts

Leadership Alignment:

TSA- Computer Programming
FIRST Robotics - Program Robot Control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Computer Programming Theory
- Analyze programming languages for uses, structure, and environment.
- Design program logic using graphical techniques (flow charts).
- Design program logic using pseudo code techniques.
- Identify the use of program design tools.
- Illustrate characteristics of technical documentation associated with software development.

Standard: Plan Programs
- Develop a problem statement.
- Define the assumptions that define the scope of the problem.
- List strategies used to gather known information.
- Apply known information to the problem statement.
- Hypothesize expected output.
- Evaluate the viability of proposed solutions.

Standard: Develop Programs
- Develop programs using desired language.
- Develop programs that use arithmetic operations.
- Develop programs that use relational operators.
- Explain and apply the use of logical operators.
- Explain and apply compound conditions.
- Explain and apply control breaks.
- Explain and apply methods of calculating subtotals and final totals.
- Explain and apply iterative and conditional loops.
- Describe common development environments.
- Explain and apply the use of sort and search routines.
- Develop interactive programs.

- Explain and apply the use of appropriate data structures, which may include arrays, linked lists, queues, and stacks.
- Design and develop classes, subclasses.
- Instantiate objects.
- Explain and apply methods of incorporating error handling routines.
- Define and apply built-in functions.
- Create user-defined functions.
- Apply language specific programming techniques.
- Test and run a program for desired output.
- Explain and apply methods used to debug a program.
- Utilize reference materials for problem solving.
- Provide internal documentation.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Conventions of Standard English (9-10)

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

1a - Use parallel structure.*

1b - Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.

2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

2a - Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.

2b - Use a colon to introduce a list or quotation.

2c - Spell correctly.

Knowledge of Language (9-10)

3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

3a - Write and edit work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's Manual for Writers) appropriate for the discipline and writing type.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

3 - Construct viable arguments and critique the reasoning of others.

4 - Model with mathematics.

5 - Use appropriate tools strategically.

6 - Attend to precision.

7 - Look for and make use of structure.

8 - Look for and express regularity in repeated reasoning.

Reading

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [x] Work Creatively with Others
- [x] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [ ] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [x] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy
- [x] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [x] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [x] Adapt to Change
- [x] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [x] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [ ] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 8 ARRAY LIST | Hours: 10

Performance Assessment(s):

Formative - After instructor introduction and class discussion students will complete worksheets where they complete segments of code and predict output from a code segment
Formative - Grade book lab
Summative - Averages Project
Summative - Quiz over concepts

Leadership Alignment:

TSA - Computer Programming
FIRST Robotics - Computer Programming

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Computer Programming Theory
- Analyze a problem identifying desired outputs for given inputs.
- Design program logic using graphical techniques (flow charts).
- Design program logic using pseudo code techniques.
- Illustrate characteristics of technical documentation associated with software development.

Standard: Plan Programs
- Develop a problem statement.
- Define the assumptions that define the scope of the problem.
- List strategies used to gather known information.
- Apply known information to the problem statement.
- Hypothesize expected output.
- Evaluate the viability of proposed solutions.

Standard: Develop Programs
- Develop programs using desired language.
- Develop programs that use relational operators.
- Explain and apply the use of logical operators.
- Explain and apply compound conditions.
- Explain and apply control breaks.
- Explain and apply methods of calculating subtotals and final totals.
- Explain and apply iterative and conditional loops.
- Explain and apply the use of sort and search routines.
- Explain and apply the use of files in programming.
- Explain and apply appropriate methods of memory management.
- Develop interactive programs.

- Explain and apply the use of appropriate data structures, which may include arrays, linked lists, queues, and stacks.
- Design and develop classes, subclasses.
- Instantiate objects.
- Explain and apply methods of incorporating error handling routines.
- Define and apply built-in functions.
- Create user-defined functions.
- Test and run a program for desired output.
- Explain and apply methods used to debug a program.
- Provide internal documentation.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Conventions of Standard English (9-10)

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

1a - Use parallel structure.*

1b - Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.

2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

2a - Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.

2b - Use a colon to introduce a list or quotation.

2c - Spell correctly.

Knowledge of Language (9-10)

3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

3a - Write and edit work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's Manual for Writers) appropriate for the discipline and writing type.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

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3 - Construct viable arguments and critique the reasoning of others.

4 - Model with mathematics.

5 - Use appropriate tools strategically.

6 - Attend to precision.

7 - Look for and make use of structure.

8 - Look for and express regularity in repeated reasoning.

Reading
Science
Social Studies
Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [x] Work Creatively with Others
- [x] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [ ] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [x] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy
- [x] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [x] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [x] Adapt to Change
- [x] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [x] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [x] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [ ] Manage Projects
- [ ] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 9 REFERENCES / PARAMETERS | Hours: 10

Performance Assessment(s):

Formative - After instructor introduction and class discussion students will complete worksheets where they complete segments of code and predict output from a code segment
Formative - Grade book lab
Summative - Averages Project
Summative - Quiz over concepts

Leadership Alignment:

TSA- Computer Programming
FIRST Robotics - Programming Robot Control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Plan Programs
- Develop a problem statement.
- Define the assumptions that define the scope of the problem.
- List strategies used to gather known information.
- Apply known information to the problem statement.
- Hypothesize expected output.
- Evaluate the viability of proposed solutions.

Standard: Develop Programs
- Develop programs using desired language.
- Develop programs that use arithmetic operations.
- Develop programs that use relational operators.
- Explain and apply compound conditions.
- Explain and apply control breaks.
- Explain and apply methods of calculating subtotals and final totals.
- Explain and apply iterative and conditional loops.
- Describe common development environments.
- Explain and apply the use of sort and search routines.
- Explain and apply the use of files in programming.
- Explain and apply appropriate methods of memory management.
- Develop interactive programs.
- Explain and apply the use of appropriate data structures, which may include arrays, linked lists, queues, and stacks.
- Design and develop classes, subclasses.
- Instantiate objects.
- Explain and apply methods of incorporating error handling routines.

- Define and apply built-in functions.
- Create user-defined functions.
- Apply language specific programming techniques.
- Test and run a program for desired output.
- Explain and apply methods used to debug a program.
- Utilize reference materials for problem solving.
- Provide internal documentation.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Conventions of Standard English (9-10)

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

1a - Use parallel structure.*

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2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

2a - Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.

2b - Use a colon to introduce a list or quotation.

2c - Spell correctly.

Knowledge of Language (9-10)

3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

3a - Write and edit work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's Manual for Writers) appropriate for the discipline and writing type.

Mathematics

CC: Mathematical Practices (MP)

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5 - Use appropriate tools strategically.

6 - Attend to precision.

7 - Look for and make use of structure.

8 - Look for and express regularity in repeated reasoning.

Reading
Science
Social Studies
Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [x] Work Creatively with Others
- [x] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [x] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [x] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy
- [x] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [x] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [x] Adapt to Change
- [x] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [x] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [ ] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 10 ADVANCED OOP | Hours: 10

Performance Assessment(s):

Formative - After instructor introduction and class discussion students will complete worksheets where they complete segments of code and predict output from a code segment
Formative - Sort by Vowels Lab
Summative - Quiz over concepts

Leadership Alignment:

TSA- Computer Programmin
FIRST Robotics - Computer Programming Robot Control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Computer Programming Theory
- Analyze programming languages for uses, structure, and environment.
- Analyze a problem identifying desired outputs for given inputs.
- Identify the use of program design tools.
- Illustrate characteristics of technical documentation associated with software development.

Standard: Plan Programs
- Develop a problem statement.
- Define the assumptions that define the scope of the problem.
- List strategies used to gather known information.
- Apply known information to the problem statement.
- Hypothesize expected output.
- Evaluate the viability of proposed solutions.

Standard: Develop Programs
- Develop programs using desired language.
- Develop programs that use arithmetic operations.
- Develop programs that use relational operators.
- Explain and apply the use of logical operators.
- Explain and apply compound conditions.
- Explain and apply control breaks.
- Explain and apply methods of calculating subtotals and final totals.
- Explain and apply iterative and conditional loops.
- Describe common development environments.
- Explain and apply the use of sort and search routines.
- Explain and apply the use of files in programming.
- Explain and apply appropriate methods of memory management.

- Develop interactive programs.
- Explain and apply the use of appropriate data structures, which may include arrays, linked lists, queues, and stacks.
- Design and develop classes, subclasses.
- Instantiate objects.
- Explain and apply methods of incorporating error handling routines.
- Define and apply built-in functions.
- Create user-defined functions.
- Apply language specific programming techniques.
- Test and run a program for desired output.
- Explain and apply methods used to debug a program.
- Utilize reference materials for problem solving.
- Provide internal documentation.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Conventions of Standard English (9-10)

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2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

2a - Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.

2b - Use a colon to introduce a list or quotation.

2c - Spell correctly.

Knowledge of Language (9-10)

3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

3a - Write and edit work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's Manual for Writers) appropriate for the discipline and writing type.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

3 - Construct viable arguments and critique the reasoning of others.

4 - Model with mathematics.

5 - Use appropriate tools strategically.

6 - Attend to precision.

7 - Look for and make use of structure.
8 - Look for and express regularity in repeated reasoning.

Reading

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [x] Work Creatively with Others
- [x] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [x] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [ ] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy
- [x] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [x] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [ ] Adapt to Change
- [x] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [x] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [ ] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 11 ARRAYS OF REFERENCES | Hours: 10

Performance Assessment(s):

Formative - After instructor introduction and class discussion students will complete worksheets where they complete segments of code and predict output from a code segment
Formative - Sort by Vowels Lab
Summative - Quiz over concepts

Leadership Alignment:

TSA-Computer Programming
FIRST Robotics - Computer Programming Robot Control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Computer Programming Theory
- Describe the relationship between hardware and software.
- Analyze a problem identifying desired outputs for given inputs.
- Design program logic using graphical techniques (flow charts).
- Design program logic using pseudo code techniques.
- Illustrate characteristics of technical documentation associated with software development.

Standard: Plan Programs
- Develop a problem statement.
- Define the assumptions that define the scope of the problem.
- List strategies used to gather known information.
- Apply known information to the problem statement.
- Hypothesize expected output.
- Evaluate the viability of proposed solutions.

Standard: Develop Programs
- Develop programs using desired language.
- Develop programs that use arithmetic operations.
- Develop programs that use relational operators.
- Explain and apply the use of logical operators.
- Explain and apply compound conditions.
- Explain and apply control breaks.
- Explain and apply methods of calculating subtotals and final totals.
- Explain and apply iterative and conditional loops.
- Describe common development environments.
- Explain and apply the use of sort and search routines.
- Explain and apply the use of files in programming.

- Explain and apply appropriate methods of memory management.
- Develop interactive programs.
- Explain and apply the use of appropriate data structures, which may include arrays, linked lists, queues, and stacks.
- Design and develop classes, subclasses.
- Instantiate objects.
- Explain and apply methods of incorporating error handling routines.
- Define and apply built-in functions.
- Create user-defined functions.
- Apply language specific programming techniques.
- Test and run a program for desired output.
- Explain and apply methods used to debug a program.
- Utilize reference materials for problem solving.
- Provide internal documentation.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Conventions of Standard English (9-10)

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

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1b - Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.

2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

2a - Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.

2b - Use a colon to introduce a list or quotation.

2c - Spell correctly.

Knowledge of Language (9-10)

3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

3a - Write and edit work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's Manual for Writers) appropriate for the discipline and writing type.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

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4 - Model with mathematics.

5 - Use appropriate tools strategically.

6 - Attend to precision.
7 - Look for and make use of structure.
8 - Look for and express regularity in repeated reasoning.

Reading

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [x] Work Creatively with Others
- [x] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [ ] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [ ] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy
- [x] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [ ] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [ ] Adapt to Change
- [ ] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [x] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [ ] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 12 INHERITANCE | Hours: 20

Performance Assessment(s):

Formative - After instructor introduction and class discussion students will complete worksheets where they complete segments of code and predict output from a code segment
Summative - Pong Project
Summative - Quiz over concepts

Leadership Alignment:

TSA - Computer Programming
FIRST Robotics - Computer Programming Robot Control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Computer Programming Theory
- Describe the relationship between hardware and software.
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- Design program logic using pseudo code techniques.
- Illustrate characteristics of technical documentation associated with software development.

Standard: Plan Programs
- Develop a problem statement.
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- Apply known information to the problem statement.
- Hypothesize expected output.
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- Develop programs using desired language.
- Develop programs that use arithmetic operations.
- Develop programs that use relational operators.
- Explain and apply the use of logical operators.
- Explain and apply compound conditions.
- Explain and apply control breaks.
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- Explain and apply iterative and conditional loops.
- Describe common development environments.
- Explain and apply the use of sort and search routines.
- Explain and apply the use of files in programming.

- Explain and apply appropriate methods of memory management.
- Develop interactive programs.
- Explain and apply the use of appropriate data structures, which may include arrays, linked lists, queues, and stacks.
- Design and develop classes, subclasses.
- Instantiate objects.
- Explain and apply methods of incorporating error handling routines.
- Define and apply built-in functions.
- Create user-defined functions.
- Apply language specific programming techniques.
- Test and run a program for desired output.
- Explain and apply methods used to debug a program.
- Utilize reference materials for problem solving.
- Provide internal documentation.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

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2a - Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.

2b - Use a colon to introduce a list or quotation.

2c - Spell correctly.

Knowledge of Language (9-10)

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Reading

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [x] Work Creatively with Others
- [x] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [ ] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [ ] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy
- [x] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [x] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [x] Adapt to Change
- [x] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [x] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [ ] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 13 RECURSION	Hours: 20

Performance Assessment(s):

Formative - After instructor introduction and class discussion students will complete worksheets where they complete segments of code and predict output from a code segment
Formative - Factorial Lab
Summative - Recursive Cirlces
Summative - Quiz over concepts

Leadership Alignment:

TSA - Computer Programming
FIRST Robotics - Computer Programming Robot Control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Computer Programming Theory
- Analyze a problem identifying desired outputs for given inputs.
- Design program logic using graphical techniques (flow charts).
- Design program logic using pseudo code techniques.
- Illustrate characteristics of technical documentation associated with software development.

Standard: Plan Programs
- Develop a problem statement.
- Define the assumptions that define the scope of the problem.
- List strategies used to gather known information.
- Apply known information to the problem statement.
- Hypothesize expected output.
- Evaluate the viability of proposed solutions.

Standard: Develop Programs
- Develop programs using desired language.
- Develop programs that use arithmetic operations.
- Develop programs that use relational operators.
- Explain and apply the use of logical operators.
- Explain and apply compound conditions.
- Explain and apply control breaks.
- Explain and apply methods of calculating subtotals and final totals.
- Explain and apply iterative and conditional loops.
- Describe common development environments.
- Explain and apply the use of sort and search routines.
- Explain and apply the use of files in programming.

- Explain and apply appropriate methods of memory management.
- Develop interactive programs.
- Explain and apply the use of appropriate data structures, which may include arrays, linked lists, queues, and stacks.
- Design and develop classes, subclasses.
- Instantiate objects.
- Explain and apply methods of incorporating error handling routines.
- Define and apply built-in functions.
- Create user-defined functions.
- Apply language specific programming techniques.
- Test and run a program for desired output.
- Explain and apply methods used to debug a program.
- Utilize reference materials for problem solving.
- Provide internal documentation.

Aligned to Washington State Standards

Arts

Communication - Speaking and Listening

Health and Fitness

Language

Conventions of Standard English (9-10)

1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

1a - Use parallel structure.*

1b - Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.

2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

2a - Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.

2b - Use a colon to introduce a list or quotation.

2c - Spell correctly.

Knowledge of Language (9-10)

3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

3a - Write and edit work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's Manual for Writers) appropriate for the discipline and writing type.

Mathematics

CC: Mathematical Practices (MP)

1 - Make sense of problems and persevere in solving them.

2 - Reason abstractly and quantitatively.

3 - Construct viable arguments and critique the reasoning of others.

4 - Model with mathematics.

5 - Use appropriate tools strategically.

6 - Attend to precision.
7 - Look for and make use of structure.
8 - Look for and express regularity in repeated reasoning.

Reading

Science

Social Studies

Writing

21st Century Skills

LEARNING AND INNOVATION

Creativity and Innovation
- [x] Think Creatively
- [x] Work Creatively with Others
- [x] Implement Innovations

Creative Thinking and Problem Solving
- [x] Reason Effectively
- [x] Use Systems Thinking
- [x] Make Judgements and Decisions
- [x] Solve Problems

Communication and Collaboration
- [x] Communicate Clearly
- [x] Collaborate with Others

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy
- [ ] Access and Evaluate Information
- [x] Use and Manage Information

Media Literacy
- [x] Analyze Media
- [x] Create Media Products

Information, Communications, and Technology (ICT Literacy)
- [x] Apply Technology Effectively

LIFE AND CAREER SKILLS

Flexibility and Adaptability
- [ ] Adapt to Change
- [x] Be Flexible

Initiative and Self-Direction
- [x] Mange Goals and Time
- [x] Work Independently
- [x] Be Self-Directed Learners

Social and Cross-Cultural
- [x] Interact Effectively with Others
- [ ] Work Effectively in Diverse Teams

Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
- [ ] Be Responsible to Others

Unit 14 ADVANCED SEARCHING AND SORTING | Hours: 10

Performance Assessment(s):

Formative - After instructor introduction and class discussion students will complete worksheets where they complete segments of code and predict output from a code segment
Formative - Factorial Lab
Summative - Recursive Cirlces
Summative - Quiz over concepts

Leadership Alignment:

TSA - Computer Programming
FIRST Robotics - Computer Programming Robot Control

Standards and Competencies

Standard: Programming Concepts
- Define what a computer program is
- Define how a computer program runs
- Identify the applications appropriate for each programming language
- Define functions/methods/procedures
- Define programming structures
- Differentiate between procedural and object oriented programming
- Define purpose and use of flowcharting and pseudo code

Standard: Computer Programming Theory
- Describe the relationship between hardware and software.
- Analyze programming languages for uses, structure, and environment.
- Design program logic using graphical techniques (flow charts).
- Design program logic using pseudo code techniques.
- Illustrate characteristics of technical documentation associated with software development.

Standard: Plan Programs
- Develop a problem statement.
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- Hypothesize expected output.
- Evaluate the viability of proposed solutions.

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- Explain and apply compound conditions.
- Explain and apply control breaks.
- Explain and apply methods of calculating subtotals and final totals.
- Explain and apply iterative and conditional loops.
- Describe common development environments.
- Explain and apply the use of sort and search routines.

- Explain and apply the use of files in programming.
- Explain and apply appropriate methods of memory management.
- Develop interactive programs.
- Explain and apply the use of appropriate data structures, which may include arrays, linked lists, queues, and stacks.
- Design and develop classes, subclasses.
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Reading
Science
Social Studies
Writing

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Productivity and Accountability
- [x] Manage Projects
- [x] Produce Results

Leadership and Responsibility
- [ ] Guide and Lead Others
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Unit 15 MATRICES | Hours: 10

Performance Assessment(s):

Formative - After instructor introduction and class discussion students will complete worksheets where they complete segments of code and predict output from a code segment
Formative - Pascals Triangle
Summative - Quiz over concepts

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