Contents

1. Test and Test Preparation Guide Development  1
2. Preparation for the Test  3
3. Competencies and Skills  5
4. Test Format and Sample Questions  11
5. Test-Taking Advice  35
6. Additional Information  37
Test and Test Preparation Guide Development

Teacher Certification Testing

Since 1980, Florida teacher certification candidates have been required to pass the Florida Teacher Certification Examination (FTCE), which has consisted of tests in reading, writing, mathematics, and professional knowledge. The 1986 Florida Legislature modified the testing program by also requiring teacher candidates to pass a test in the subject area in which they wish to be certified. In addition, the Legislature substituted the Florida College-Level Academic Skills Test (CLAST) for the reading, writing, and mathematics portions of the FTCE. The 2000 Florida Legislature replaced the CLAST with the General Knowledge Test, effective July 1, 2002.

The subject area knowledge tested on the Computer Science K-12 examination was identified and validated by committees of content specialists from within the state of Florida. A majority of the committee members were public school teachers, but the committees also included district supervisors and college faculty with expertise in this field. Committee members were selected on the basis of recommendations by professional associations, experts in the field, and teachers' unions. In developing the test, the committees used an extensive literature review, interviews with selected public school teachers, a large-scale survey of teachers, pilot tests, and their own professional judgment.

Role of the Test Preparation Guide

The purpose of this test preparation guide is to help candidates taking the Initial Teacher Subject Area Test in Computer Science K-12 prepare effectively for the examination. The guide was designed to familiarize prospective test takers with various aspects of the examination, including the content that is covered and the way it is represented. The guide should enable candidates to direct their study and to focus on relevant material for review.

This test preparation guide is intended primarily for use by certification candidates, who may be students in a college or university teacher-preparation program, teachers with provisional certification, teachers seeking certification in an additional subject area, or persons making a career change to public school teaching. Candidates may have studied and worked in Florida or may be from out of state.
College or university faculty may also use the guide to prepare students for certification, and inservice trainers may find the guide useful for helping previously certified teachers prepare for recertification or multiple certification.

This test preparation guide is not intended as an all-inclusive source of subject area knowledge, nor is it a substitute for college course work in the subject area. The sample items are not an exact representation of the content of the actual test. Instead, the guide is intended to help candidates prepare for the subject area test by presenting an overview of the content and format of the examination.
Preparation for the Test

The following outline may help you to prepare for the examination. Adapt these suggestions to suit your own study habits and the time you have available for review.

Overview

- Look over the organization of the test preparation guide.
  Section 1 discusses the development of the test and test preparation guide.
  Section 2 (this section) outlines test preparation steps.
  Section 3 presents information about the content of the test.
  Section 4 lists question formats and includes sample test items.
  Section 5 offers strategies for taking the test.
  Section 6 identifies sources of further information.

Self-Assessment

- Decide which content areas you should review.
  Section 3 includes the competencies and skills used to develop this subject area test and the approximate proportion of test items from each competency area.

Review

- Study according to your needs.
  Review all of the competencies, concentrating on areas with which you are least familiar.

Practice

- Acquaint yourself with the format of the examination.
  Section 4 describes types of questions you may find on the examination.

- Answer sample test questions.
  Section 4 gives you an opportunity to test yourself with sample test questions and provides an answer key.

Final preparation

- Review test-taking advice.
  Section 5 includes suggestions for improving your performance on the examination.
## Competencies and Skills

The table on the following pages lists the competencies and skills used as the basis for the Computer Science K-12 examination. These competencies and skills represent the knowledge that teams of teachers, subject area specialists, and district-level educators have determined to be important for beginning teachers. This table could serve as a checklist for assessing your familiarity with each of the areas covered by the test. The competencies and skills should help you to organize your review.

The following excerpt illustrates the components of the table:

<table>
<thead>
<tr>
<th>Competency/Skill</th>
<th>Percentage of total test items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of problem solving and algorithms</td>
<td>18</td>
</tr>
</tbody>
</table>

1. Distinguish between programming paradigms: object-oriented and procedural.
2. Identify an appropriate algorithm for a given problem.
3. Trace an algorithm and predict outputs for a given input.
4. Identify a minimum set of data necessary for testing a computer solution.
5. Identify problems appropriate for computer solution.
6. Distinguish between the classes of algorithmic constructs: sequence, decision, iteration, recursion, and selection.
7. Identify appropriate and efficient search algorithms for linear structures: sequential and binary.
8. Identify appropriate and efficient structures for searchable data: linear lists, binary search trees, and hash tables.

**Competencies** are areas of content knowledge.

**Skills** identify behaviors that demonstrate the competencies.

**Percentages** indicate the approximate proportion of test items that represent the competencies on the test.
Table of Competencies, Skills and Percentages

<table>
<thead>
<tr>
<th>Competency/Skill</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Knowledge of problem solving and algorithms</td>
<td>18</td>
</tr>
<tr>
<td>1 Distinguish between programming paradigms: object-oriented and procedural.</td>
<td></td>
</tr>
<tr>
<td>2 Identify an appropriate algorithm for a given problem.</td>
<td></td>
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<tr>
<td>3 Trace an algorithm and predict outputs for a given input.</td>
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<tr>
<td>4 Identify a minimum set of data necessary for testing a computer solution.</td>
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<tr>
<td>5 Identify problems appropriate for computer solution.</td>
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<tr>
<td>6 Distinguish between the classes of algorithmic constructs: sequence, decision, iteration, recursion, and selection.</td>
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<tr>
<td>7 Identify appropriate and efficient search algorithms for linear structures: sequential and binary.</td>
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<tr>
<td>8 Identify appropriate and efficient structures for searchable data: linear lists, binary search trees, and hash tables.</td>
<td></td>
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<tr>
<td>9 Identify appropriate and efficient sorting algorithms for data sets: selection, insertion, merge, and quick sort.</td>
<td></td>
</tr>
<tr>
<td>10 Identify string-processing algorithms: concatenation, substring extraction, and pattern matching.</td>
<td></td>
</tr>
<tr>
<td>11 Identify the stages of the software development process: problem definition, analysis, design, implementation, testing, and maintenance.</td>
<td></td>
</tr>
<tr>
<td>2 Knowledge of data types and structures</td>
<td>13</td>
</tr>
<tr>
<td>1 Distinguish between local and global identifiers in a procedural program.</td>
<td></td>
</tr>
<tr>
<td>2 Distinguish between constants and variables.</td>
<td></td>
</tr>
<tr>
<td>3 Distinguish between integer, floating point, character, Boolean, and object data types.</td>
<td></td>
</tr>
<tr>
<td>4 Distinguish between data structures or types: arrays, strings, linked lists, trees, hash tables, records, files, stacks, queues, sets, and maps.</td>
<td></td>
</tr>
<tr>
<td>5 Distinguish between instance, class, and local (method) variables in an object-oriented program.</td>
<td></td>
</tr>
<tr>
<td>6 Distinguish between public and private methods in an object-oriented program.</td>
<td></td>
</tr>
<tr>
<td>7 Identify key features of object-oriented programs: encapsulation, inheritance, and polymorphism.</td>
<td></td>
</tr>
<tr>
<td>Competency/Skill</td>
<td>%</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>----</td>
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<tr>
<td>8 Identify components of class declarations for an object-oriented program:</td>
<td></td>
</tr>
<tr>
<td>instance and class variables, constructors, and methods.</td>
<td></td>
</tr>
<tr>
<td>3 Knowledge of computer programming</td>
<td>27</td>
</tr>
<tr>
<td>(All programming will be done in Logo, Visual Basic, C++, and Java)</td>
<td></td>
</tr>
<tr>
<td>1 Predict the output of a given program containing only sequential execution.</td>
<td></td>
</tr>
<tr>
<td>2 Complete a program involving only sequential execution when given an</td>
<td></td>
</tr>
<tr>
<td>incomplete program with a specified output.</td>
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<tr>
<td>3 Predict the output of a given program containing conditional statements.</td>
<td></td>
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<tr>
<td>4 Complete a program for a specified output given an incomplete program</td>
<td></td>
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<tr>
<td>containing conditionals.</td>
<td></td>
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<tr>
<td>5 Debug a program containing an error involving conditional statements.</td>
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<tr>
<td>6 Predict the output of a given program involving iteration.</td>
<td></td>
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<tr>
<td>7 Debug a program containing an error associated with iteration.</td>
<td></td>
</tr>
<tr>
<td>8 Predict the output of programs involving subroutines, functions, or methods.</td>
<td></td>
</tr>
<tr>
<td>9 Debug a program containing an error associated with subroutines, functions,</td>
<td></td>
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<tr>
<td>or methods.</td>
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<tr>
<td>10 Predict the output of a program involving interacting objects.</td>
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<tr>
<td>11 Debug a program containing an error involving interacting objects.</td>
<td></td>
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<tr>
<td>12 Predict the output of programs involving parameters passed by value</td>
<td></td>
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<tr>
<td>and/or reference.</td>
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<tr>
<td>13 Identify error types: syntax, runtime, and logic.</td>
<td></td>
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<tr>
<td>14 Identify appropriate preconditions and/or postconditions for a given</td>
<td></td>
</tr>
<tr>
<td>function or method.</td>
<td></td>
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<tr>
<td>15 Identify the strengths and/or weaknesses of object-oriented and</td>
<td></td>
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<tr>
<td>procedural languages (e.g., Visual Basic, C++, Java, Logo).</td>
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<tr>
<td>16 Identify the advantages of internal and external documentation of</td>
<td></td>
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<tr>
<td>programming.</td>
<td></td>
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<tr>
<td>17 Identify appropriate internal documentation for a group of program</td>
<td></td>
</tr>
<tr>
<td>statements.</td>
<td></td>
</tr>
</tbody>
</table>
**Table of Competencies, Skills and Percentages**

<table>
<thead>
<tr>
<th>Competency/Skill</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Knowledge of computer hardware</td>
<td></td>
</tr>
<tr>
<td>1 Identify the functions of a computer system: input, output, processing, and storage (primary and secondary).</td>
<td></td>
</tr>
<tr>
<td>2 Distinguish between serial and parallel interfaces.</td>
<td></td>
</tr>
<tr>
<td>3 Identify the major components of the CPU (i.e., registers, ALU, control unit) and their functions.</td>
<td></td>
</tr>
<tr>
<td>4 Identify the advantages and/or disadvantages of storing data on various media.</td>
<td></td>
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<tr>
<td>5 Identify the functions of the components of a network (e.g., servers, routers, switches, hubs, workstations).</td>
<td></td>
</tr>
<tr>
<td>6 Identify the advantages and/or disadvantages of networking.</td>
<td></td>
</tr>
<tr>
<td>7 Distinguish between various types of networks.</td>
<td></td>
</tr>
<tr>
<td>5 Knowledge of computer software</td>
<td>13</td>
</tr>
<tr>
<td>1 Identify the functions of an operating system.</td>
<td></td>
</tr>
<tr>
<td>2 Identify the advantages and/or disadvantages of programs that are either compiled or interpreted.</td>
<td></td>
</tr>
<tr>
<td>3 Identify the features and functions of productivity software: word processors, spreadsheets, databases, desktop publishing, multimedia, Web authoring, graphics, and image processing.</td>
<td></td>
</tr>
<tr>
<td>4 Identify types of Internet connectivity.</td>
<td></td>
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<tr>
<td>5 Identify features and functions of electronic mail.</td>
<td></td>
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<tr>
<td>6 Identify features and functions of Web browsers.</td>
<td></td>
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<tr>
<td>7 Identify features and functions of search engines.</td>
<td></td>
</tr>
<tr>
<td>8 Identify features and functions of security software (e.g., firewalls, antivirus programs, encryption).</td>
<td></td>
</tr>
<tr>
<td>6 Knowledge of the social, ethical, and legal issues of computer technologies</td>
<td>8</td>
</tr>
<tr>
<td>1 Identify examples of appropriate use, and misuse, of intellectual property (e.g., software licensing, plagiarism, archival copying, music and video piracy, fair use of copyrighted materials).</td>
<td></td>
</tr>
<tr>
<td>2 Identify threats to privacy from centralized databases and commercial use of the Internet.</td>
<td></td>
</tr>
<tr>
<td>Competency/Skill</td>
<td>Items</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------</td>
</tr>
<tr>
<td>3</td>
<td>Identify examples of malicious interference with computer systems (e.g., worms, deletion of files, spam).</td>
</tr>
<tr>
<td>4</td>
<td>Identify the positive and/or negative impacts of computer technology.</td>
</tr>
<tr>
<td>5</td>
<td>Identify the roles and responsibilities of computer science professionals.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7</th>
<th>Knowledge of the history of computer technology</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identify important contributions of individuals or groups to the development of computer technology.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Identify generational milestones in the historical development of computer technology.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8</th>
<th>Knowledge of computer science pedagogy</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identify effective management strategies for teaching computer science (e.g., laboratory work, cooperative learning, electronic communications).</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Identify effective instructional strategies for teaching computer science (e.g., case studies, role-playing, manipulatives, visualizations).</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Identify effective assessment strategies for teaching computer science.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Identify appropriate accommodations and adaptations for students with special needs.</td>
<td></td>
</tr>
</tbody>
</table>
Test Format and Sample Questions

The Computer Science K-12 subject area test consists of approximately 120 multiple-choice questions. You will have two-and-one-half hours to complete the test.

You will receive a test booklet and a separate answer sheet. Each question will contain four response options, and you will record your selection by bubbling in A, B, C, or D on the answer sheet.

The table below presents types of questions on the examination and directs you to examples of these formats among the sample items that follow.

Table of Question Formats

<table>
<thead>
<tr>
<th>Type of question</th>
<th>Sample item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sentence completion</strong></td>
<td>Item 36, page 28</td>
</tr>
<tr>
<td>Select the response option that best completes the sentence.</td>
<td></td>
</tr>
<tr>
<td><strong>Direct question</strong></td>
<td>Item 1, page 13</td>
</tr>
<tr>
<td>Choose the response option that best answers the question.</td>
<td></td>
</tr>
<tr>
<td><strong>Scenario</strong></td>
<td>Item 40, page 29</td>
</tr>
<tr>
<td>Examine a situation, problem, or case study. Then answer a question, make a diagnosis, or recommend a course of action by selecting the best response option.</td>
<td></td>
</tr>
<tr>
<td><strong>Command</strong></td>
<td>Item 17, page 18</td>
</tr>
<tr>
<td>Select the best response option.</td>
<td></td>
</tr>
</tbody>
</table>
Sample Items

The following items represent both the form and content of questions you will encounter on the examination. These sample items cannot cover all of the competencies and skills that are tested, and they can only approximate the degree of difficulty of actual examination questions. However, these items will acquaint you with the general format of the examination.

An answer key follows on page 34.
DIRECTIONS: Read each item and select the best response.

1. Which of the following is a reason to use the object-oriented programming paradigm?
   A. to increase execution speed
   B. to reduce the amount of source code
   C. to make programs reusable
   D. to make programs easier to run

2. Which of the following algorithms will compute the sum of the first 10 positive integers?
   A. `sum = 0;
      for (i = 1, i < 11, i++) sum = sum + i;
   B. `sum = 0;
      for (i = 1, i < 10, i++) sum = sum + i;
   C. `sum = 1;
      for (i = 2, i < 10, i++) sum = sum + i;
   D. `sum = 10;
      for (i = 10, i < 0, i--) sum = sum * i;

3. Given the input {2, 5, 4, 5, 4,}, what is the correct output of the following algorithm?

   ```
   value = 0
   i = 0
   while i < 5
      read a number
      if (number mod 2 is equal to zero) then value = value + number
      i = i + 1
   avg_total = value / i
   output avg_total
   ```

   A. 20
   B. 10
   C. 4
   D. 2
4. Given the following C++ program segment, select the minimum set of data required to test the program segment.

```cpp
cout << "What was your score on the test?";
cin >> score;
if (score >= 90)
    cout << "Excellent!" << endl;
else if (score >= 75)
    cout << "Not too bad." << endl;
else
    cout << "Study harder next time!" << endl;
```

A. 90, 80, 70
B. 90, 80, 70, 0
C. 90, 75
D. 90, 80, 75

5. Which of the following problems is LEAST appropriate for a computer solution?

A. processing payroll for a school district
B. finding the mean, mode, and standard deviation of a set of test scores
C. maintaining inventory for a department store
D. evaluating the talent portion of a beauty contest

6. Which algorithmic construct is illustrated by the algorithm below?

```cpp
if (month = 1) then print "January"
else if (month = 2) then print "February"
   :
else print "December"
```

A. sequence
B. decision
C. iteration
D. recursion
7. Given the following list of integers in the order in which they appear, which search algorithm would be the most appropriate to find the position of the number "7" in the list?

   3, 1, 5, 2, 7, 9, 10

   A. random search
   B. linear search
   C. binary search
   D. selection search

8. A collection of items are to be stored. The following operations are performed on this collection frequently: adding a new item, looking up an item, removing an item, listing the items in order. Which of the following data structures would be the best choice for storing this collection?

   A. hash table
   B. linked list, in order
   C. stack
   D. binary search tree

9. Given two strings "match" and "make", which of the following string algorithms would be appropriate to create the string "makematch" from the two given strings?

   A. merge string
   B. substring extraction
   C. concatenation
   D. pattern matching

10. Identify the stage in the software development life cycle in which the project feasibility study occurs.

    A. analysis
    B. implementation
    C. problem definition
    D. testing
11. Given the following C++ program segment, identify which variable is global.

```cpp
void Fun1(int x, int & y)
{
    int z = 12;
    // various code
}
int w;
void main()
{
    int r = 3, s = 4, t = 5;
w = 12;
Fun1(r, s, t);
    // various code
}

A. w
B. x
C. y
D. r, s, or t
```

12. Given the following C++ program segment, identify the variable constant.

```cpp
void Fun (int x)
{
    const pi = 3.14159;
    cout << "The area of the circle is: " << pi * x * x << endl;
}
int main()
{
    int a = 5;
double m;
cout << "Find the area of a circle." << endl;
    Fun(8);
}

A. a
B. 8
C. pi
D. m
```
13. When dealing with integer and decimal numbers in the same calculation, what is the resultant data type?
   A. character
   B. integer
   C. object
   D. floating point

14. Given the following class declaration:

   ```java
   public class Rectangle extends Shape {
       private int mywidth;
       private int myheight;

       public Rectangle(int x, int y, int width, int height) {
           super(x, y);
           mywidth = width;
           myheight = height;
       }

       public int getHeight() {
           return myheight;
       }

       public int getWidth() {
           return mywidth;
       }
   }
   ```

   Which identifier represents a method?
   A. height
   B. mywidth
   C. getWidth
   D. x

15. Which feature is associated with the concept of encapsulation in an object-oriented program?
   A. The data and the methods that operate on that data are in the same class.
   B. Functions and methods for a program are all in the same code.
   C. Methods of a super class are accessible in the child class.
   D. Multiple methods with the same name having different parameters are legal.
16. In the program below, line numbers on the left are used for reference only.

```java
import Rectangle;

public class TestRectangle{
    public static void main(String[] args){
        int xloc, yloc, awidth, aheight;
        xloc = 50;
        yloc = 30;
        awidth = 5;
        aheight = 10;

        Rectangle rect = new Rectangle(xloc, yloc, awidth, aheight);
        System.out.println("The x coord of the rectangle is " + rect.getX());
    }
}
```

Which line of the code constructs an instance of a class?

A. 1  
B. 4  
C. 5  
D. 9

17. Select the correct output of the C++ program segment below.

```cpp
int x = 5;
int y = 10;
int z;
z = x;
x = y;
y = z;
cout << x << " " << y ;
```

A. 5 5  
B. 10 5  
C. 10 10  
D. 15 15
18. The C++ program segment below prompts the user to type in two numbers and the segment
prints the average of the two numbers.

    cout << "Enter the first number";
    cin >> num1;
    cout << "Enter the second number";
    cin >> num2;

________________________

    average = sum / 2;
    cout << "The average is: " << average;

Which statement best fills the blank line to correctly complete the program?

A. sum++;  
B. sum = num1 + num2;  
C. num1 + num2 = sum;  
D. num1 += num2;

19. Given the following input values (in this order), indicate which is the correct output for the
following BASIC program segment.

    INPUT DATA: 5, 12, 9

    input X
    input Y
    input Z
    if (X < Y) and (Y < Z) then print X
    elseif (Y < Z) and (Z < X) then print Y
    else print Z
    end

A. 5  
B. X  
C. 9  
D. 12
20. The C++ program segment below prompts the user to enter a number representing grade level and outputs the appropriate string (senior, junior, or sophomore). Assume the input for the level is 12, and the output is the string "senior".

```cpp
cout << "Enter the grade level (10, 11, or 12)";
cin >> level;

if (years == 4)
    cout << "senior" << endl;
else if (years == 3)
    cout << "junior" << endl;
else if (years == 2)
    cout << "sophomore" << endl;
```

Which statement best fills in the blank in the program segment?
A. `years = level - 9;`
B. `years = level - 8;`
C. `years -= 8;`
D. `years -= 9;`

21. The following C++ program segment contains a logic error. The segment is to determine (and print) if the user input is in the requested range.

```cpp
cout << "Type a number from 1 to 100";
cin >> number;
if (number > 1) || (number < 100)
    cout >> "The number is in the correct range" << endl;
```

Identify the "if" below that corrects the logic error.
A. `if (number >= 1) && (number <= 100)`
B. `if (number >= 1) || (number <= 100)`
C. `if (number > 1) && (number < 100)`
D. `if (number < 1) || (number > 100)`
22. Given the following C++ program segment, predict the output after the loop.

```c++
int count = 0;
while (count < 10)
    count += 1;
cout << count;
```

A. 9  
B. 10  
C. 11  
D. 55

23. The following C++ program segment contains a logic error. The segment is to output the numbers between 1 and 100 inclusive. Which choice below corrects the error?

```c++
int count = 1;
do
    count += 1;
    cout << count;
while (count < 100);
```

A. change the condition to "count <= 100"  
B. replace the "do-while" loop with a "while" loop with the same test  
C. initialize count to 0  
D. change the condition to "count > 100"
24. Given code from a C++ program, predict the output of the "cout" statement.

```cpp
void Fun1 (int a)
{
    a++;  
    cout << a << endl;
}
void Fun2 (int b)
{
    b--;  
    Fun1 (b);  
}
void main()
{
    int x = 5;  
    Fun2 (x);  
}
```

A. 4  
B. 5  
C. 6  
D. 7

25. The following C++ program segment contains a syntax error. The segment is to produce the product of two numbers and output the result.

```cpp
void Fun1(int x, int y)
{
    return x * y;
}
void main()
{
    int a = 5, b = 6;  
    int product = Fun1 (a, b);  
    cout << product << endl;
}
```

Which of the choices below would correct the error?

A. The return type of function Fun1 must be float or double.  
B. The return type of function Fun1 must be int.  
C. There must be a reference parameter in the heading of Fun1.  
D. The parameters of Fun1 must be named "a" and "b".
26. Given code from a C++ program, predict the output of the "cout" statement.

```cpp
void Fun1 (int a)
{
  int x = 5;
  a++;
  x = x + a++;
}
void Fun2 (int &b)
{
  --b;
  Fun1(b);
}
void main()
{
  int x = 5;
  Fun2(x);
  cout << x << endl;
}
```

A. 9  
B. 6  
C. 5  
D. 4

27. What type of error is committed by the C++ program below?

```cpp
void main()
{
  float price = 10.93;
  float tax = 0.075;
  cost = price * tax + price;
  cout << cost << endl;
}
```

A. syntax  
B. runtime  
C. logic  
D. spelling
Directions: For item 28, refer to the following files.

```
/////////  file: Shape.java  /////
public abstract class Shape {
    private int myx;
    private int myy;
    public Shape(int x, int y) {
        myx = x;
        myy = y;
    }
    public int getX() {
        return myx;
    }
    public int getY() {
        return myy;
    }
}

/////////  file: Rectangle.java  /////
public class Rectangle extends Shape {
    private int mywidth;
    private int myheight;
    public Rectangle(int x, int y, int width, int height) {
        super(x, y);
        mywidth = width;
        myheight = height;
    }
    public int getHeight() {
        return myheight;
    }
    public int getWidth() {
        return mywidth;
    }
}

/////////  file: TestRectangle.java  /////
import Rectangle;
public class TestRectangle{
    public static void main(String[] args){
        int xloc, yloc, awidth, aheight;
        xloc = 50;
        yloc = 30;
        awidth = 5;
        aheight = 10;
        Rectangle rect = new Rectangle(xloc, yloc, awidth, aheight);
        System.out.println(rect.getX());
    }
}
```
28. Given the three Java files on the previous page, what is the output of the System.out.println() statement in the class TestRectangle?

A. 5  
B. 10  
C. 30  
D. 50

29. 

```c++
void if_true (bool y)
{
    if (y) {
        cout << "ON" << endl;
        return;
    }
    cout << "OFF"<< endl;
    return;
}
```

Given the C++ function above, identify the precondition of the parameter passed to the function in order for the result to be the string "OFF".

A. false  
B. true  
C. undefined  
D. true or false
Directions: For item 30, refer to the following files.

///////////  file: Shape.java  /////////////
public abstract class Shape {
    private int myx;
    private int myy;

    public Shape(int x, int y) {
        myx = x;
        myy = y;
    }

    public int getX() {
        return myx;
    }

    public int getY() {
        return myy;
    }
}

///////////  file: Rectangle.java  /////////////
public class Rectangle extends Shape {
    private int mywidth;
    private int myheight;

    public Rectangle(int x, int y, int width, int height) {
        super(x, y);
        mywidth = width;
        myheight = height;
    }

    public int getHeight() {
        return myheight;
    }

    public int getWidth() {
        return mywidth;
    }
}

///////////  file: TestRectangle.java  /////////////
import Rectangle;
public class TestRectangle {
    public static void main(String[] args) {
        int xloc, yloc, awidth, aheight;
        xloc = 50;
        yloc = 30;
        awidth = 5;
        aheight = 10;

        Rectangle rect = new Rectangle;
        System.out.println("The x coord of the rectangle is " + rect.getX());
    }
}
30. Given the three Java files on the previous page, what error occurs in the TestRectangle file that prevents the program from running?
   A. The Rectangle object is incorrectly instantiated.
   B. There is no setX function in the Shape class.
   C. There is no setX function in the Rectangle class.
   D. There should be "get" and "set" functions in the Rectangle class.

31. What type of error is committed in the following LOGO program?

   CS
   HOME
   RIGHT 45
   go FD 100
   RT 45
   goto FD 200
   Home

   A. syntax
   B. logic
   C. runtime
   D. compiler

32. The most important reason for providing internal program documentation is

   A. runtime efficiency.
   B. reduced execution time.
   C. decreased programming time.
   D. explanation of code segments.
33. What would be an appropriate comment to document the following piece of C++ code?

```cpp
if (score >= 70)
    pass = true;
else
    pass = false;
```

A. // If score is at least 70, set pass to true, else false.
B. // Determine if student passed the exam.
C. // Determine if the test was hard.
D. // Calculate the average on the exam.

34. Which of the following demonstrates the input function of a computer system?

A. Mrs. Smith saves spreadsheet data to a disk.
B. Mrs. Smith uses the spreadsheet to compute student averages.
C. Mrs. Smith enters student grades into a spreadsheet.
D. Mrs. Smith prints a spreadsheet.

35. Choose the interface that is indicative of data flowing across multiple wires simultaneously.

A. external modem
B. USB
C. parallel
D. IEEE 1394

36. The CPU is composed of the

A. ALU, ROM, and RAM.
B. control unit and the ALU.
C. RAM, ROM, and control unit.
D. ROM and the microprocessor.

37. The CPU performs which function(s)?

A. retrieves, decodes, and executes instructions
B. manages system resources
C. boots and initializes computer
D. saves data and programs
38. Computer users want to access an application stored on a network. On which network component would the users locate the application?
   A. hub  
   B. router  
   C. switch  
   D. server

39. Which of the following is the primary advantage of networking?
   A. shared access to resources  
   B. increased security capability  
   C. ease of technical administration  
   D. implementation cost

40. A computer laboratory at the local high school is equipped with 25 computers that are networked and share a single high-speed printer. They are connected by a daisy chain with a terminator at each end of the chain. The printer is directly connected to one of the computers in the chain. Identify what type of network this laboratory represents.
   A. peer to peer  
   B. ethernet  
   C. token ring  
   D. client/server

41. Which of the following is a disadvantage of a compiled programming language?
   A. slower program execution  
   B. resulting object code is platform independent  
   C. runtime errors are ignored during program execution  
   D. entire syntax must be correct before program executes

42. Which of the following is a standard feature of word processing software?
   A. calculator of values  
   B. graph  
   C. record search  
   D. spell checker
43. The type of connectivity that is cheapest and most readily available is
   A. broadband.
   B. direct dial.
   C. satellite.
   D. wireless.

44. Which of the following electronic mail features would support the creation of a list of potential recipients?
   A. address book
   B. carbon copy
   C. inbox
   D. reply option

45. Which of the following is a function of Web browsers?
   A. creating a text file
   B. deleting an HTML page
   C. viewing source code
   D. editing source code

46. When Ms. Haines teaches her second graders how to use search engines, the most appropriate search engine to use would be one that incorporates
   A. Boolean terms.
   B. graphics.
   C. keyword searches.
   D. a search bar on the Web browser.

47. Which security software would allow the safe transferral of student data from the school's network to a district-level office?
   A. antivirus
   B. encryption
   C. filtering
   D. firewall
48. Mr. Lawton purchased a copy of a popular desktop publishing software package for home use, and he would like to install a copy of this program to use with his students in a 30-station computer laboratory. The school's network administrator tells Mr. Lawton that this is not allowed under the acceptable user policy of the school district because

A. Mr. Lawton does not have the principal's permission to teach desktop publishing.
B. the software package does not meet the server specifications.
C. the software package is intended for a single user only.
D. Mr. Lawton's desktop computer does not have shared access capability.

49. Ms. Chen facilitates a discussion with her class about the importance of the safe use of electronic mail. She presents this scenario: A student receives an e-mail message from someone who states that he is a representative of the Internet service provider (ISP). The representative asks the student to supply his parents' credit card number and Social Security numbers. Ms. Chen then asks her class to identify the student's best course of action.

Which of the following would be the best action to recommend?

A. Provide the information requested and contact the Internet service provider to tell them that someone has asked for personal information through their service.
B. Give the information to the representative, but request the information be safeguarded.
C. Inform his parents so they can handle the situation as they deem appropriate.
D. Ask his parents for a credit card number and then give it to the representative.

50. Which of the following is an acceptable use of the school's network by a classroom teacher who does not have administrative network rights?

A. addition of a computer workstation
B. demonstration of a Web browser
C. download of shareware software
D. modification of network system files

51. Which of the following scenarios represents a positive impact of computer technology?

A. A college-aged child calls home with a financial emergency. The problem is resolved by a transfer of funds made possible by online banking.
B. A data entry clerk gets to take time off to allow her carpal tunnel syndrome to subside.
C. An office support person decides to take the last half hour at work to read personal electronic mail because the network connection is so much faster than his modem at home.
D. An office staff has time to play some of the games on the computers because the LAN is down.
52. Which of the following milestones occurred first in the historical development of computer technology?
   A. transistors
   B. integrated circuits
   C. very large scale integration
   D. vacuum tubes

53. The computer science teacher who aims to promote group development of programming code would best use which of the following management strategies?
   A. electronic communications
   B. cooperative learning
   C. independent programming activities
   D. laboratory work

54. Mr. Miller is going to introduce database concepts to middle school students. Which of the following management strategies would be most effective?
   A. lecture
   B. cooperative learning
   C. electronic communications
   D. laboratory work

55. Using robots to demonstrate the outcome of programming instructions would be an example of
   A. cooperative learning.
   B. independent activities.
   C. lecture.
   D. manipulatives.

56. An elementary school has a student population that includes many ESL (English as a Second Language) students. Which of the following computer laboratory adaptations would be the most effective in helping these students listen to a reading program?
   A. change of mouse speed
   B. language modification of keyboard
   C. speech-synthesizer software
   D. voice recognition software
# Answer Key

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Test-taking Advice

• Go into the examination prepared, alert, and well rested.

• Complete your travel arrangements prior to the examination date. Plan to arrive early so that you can locate the parking facilities and examination room without rushing.

• Dress comfortably and bring a sweater or jacket in case the room is too cool.

• Take the following with you to the test site:
  Admission ticket
  Picture identification
  Watch
  Money for lunch and change for vending machines

• There are many strategies for taking a test and different techniques for dealing with different types of questions. Nevertheless, you may find the following general suggestions useful.

  • Read each question and all the response options carefully before marking your answer. Pay attention to all of the details.
  • Go through the entire test once and answer all the questions you are reasonably certain about. Then go back and tackle the questions that require more thought.
  • Check periodically to be sure that you are correctly coding your answers on the answer sheet. When you answer a question out of sequence, be certain that the number of the circle you mark on your answer sheet corresponds to the proper question number in the test booklet.
  • When you are not certain of the right answer, eliminate as many options as you can and choose the response that seems best. It is to your advantage to answer all the questions on the test, even if you are uncertain about some of your choices.
  • Be certain to mark your answers clearly on the answer sheet. If you change an answer, erase the first pencil mark completely. Also make sure there are no stray marks on the answer sheet.
  • After completing the examination, go back and check every question. Verify that you have answered all of the questions and that your responses are correctly entered.
**Additional Information**

Write to the following address to request an FTCE registration bulletin. You may also request information on test administration, retakes, and score reports, or offer comments about this test preparation guide.

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