COMPUTER PROGRAMMING CONCEPTS
(390)

—OPEN EVENT—

REGIONAL – 2014

DO NOT WRITE ON TEST BOOKLET

TOTAL POINTS _____ *(500)*

Failure to adhere to any of the following rules will result in disqualification:
1. **Contestant must hand in this test booklet and all printouts. Failure to do so will result in disqualification.**
2. **No equipment, supplies, or materials other than those specified for this event are allowed in the testing area. No previous BPA tests and/or sample tests or facsimile (handwritten, photocopied, or keyed) are allowed in the testing area.**
3. **Electronic devices will be monitored according to ACT standards.**

No more than 60 minutes testing time

Answer the following questions on the scantron answer form provided.

1. What is a variable?
    a. An unchanging constant piece of user-generated data
    b. A reference to dynamic information
    c. A randomly generated number
    d. A slider user-interface control

2. Which numerical base includes the use of Roman letters to express numerical values?
    a. Binary
    b. Octal
    c. Decimal
    d. Hexidecimal

3. Dividing a problem or task into parts is an example of…
    a. Generality
    b. Abstraction
    c. Encapsulation
    d. Compilation

4. A signed number can express which values?
    a. Positive values only
    b. Negative values only
    c. Positive and negative values
    d. Neither positive nor negative values

5. Which of the following is not an example of a common variable type?
    a. Boolean
    b. Unit
    c. Integer
    d. String

6. What is the value of m after the following fragment of pseudo-code is executed?

```
a = 2
b = 2
c = 4
If (a > b) Then
    If (a > c) Then
        m = 1
    Else
        m = 2
    End If
Else
    If (c != 0) Then
        m = 3
    Else
        m = 4
    End If
End If
```

    a. 1
    b. 2
    c. 3
    d. 4

7. An overflow error occurs when…
    a. A value is too large for its data type
    b. Too many variables are defined in a single program
    c. An integer is divided by a floating-point number
    d. A decimal value is stored into an integer-typed variable

8. A conditional or decision node in a flowchart is represented by which shape?
    a. Rectangle
    b. Parallelogram
    c. Oval
    d. Diamond

9. What is the value of j after the following loop terminates?
    j = 0
    for (i = 0; i < 10; i += 2) {
      j += 1
    }
    a. 0
    b. 1
    c. 5
    d. 10

10. A _____ is the context within a program in which a variable is valid.
    a. Binding
    b. Scope
    c. Syntax
    d. Declaration

11. The creation of a variable, making it available for future use, is called…
    a. Initialization
    b. Allocation
    c. Garbage Collection
    d. Incrementation

12. Assignment of a starting value to a variable prior to manipulation is called…
    a. Initialization
    b. Allocation
    c. Garbage Collection
    d. Incrementation

13. Which of the following expressions is commonly used to increment the numeric value of a variable by one unit?
    a. +=
    b. ++
    c. +
    d. +!

14. Which of the following conditionals are useful for testing greater than two unique conditions without nesting?
    a. If-else
    b. Switch
    c. Both of the above
    d. None of the above

15. What does g *= 5 mean?
    a. Add 5 to the current value of g
    b. Replace the current value of g with the value 5
    c. Test if g and 5 are equivalent values
    d. Replace the current value of g with the value of g multiplied by 5

16. A function can accept input via local variables known as…
    a. Functors
    b. Parameters
    c. Switches
    d. Scopes

17. What is the result of ("1 + 3 * 2")?
    a. 7
    b. 8
    c. "1 + 6"
    d. "1 + 3 * 2"

18. _____ is a representation of code that mixes natural language with programming language syntax.
    a. A program
    b. A statement
    c. Pseudo-code
    d. A flowchart diagram

19. In some languages, you may place the _____ symbol to signify the end of a command.
    a. /
    b. #
    c. \
    d. ;

20. Why do computers represent data as binary numbers (zeroes and ones)?
    a. Combinations of zeroes and ones can represent any number or character value
    b. Digital devices have two stable states, making it natural to use zero for one state and 1 for the other
    c. Binary numbers are simplest
    d. Binary numbers are the basis upon which all other number systems are built

21. A byte has _____ bits.
    a. 4
    b. 8
    c. 12
    d. 16

22. A _____ translates high-level programming language code into machine language.
    a. Assembler
    b. Compiler
    c. CPU
    d. Operating System

23. A _____ error does *not* cause a program to abort but produces incorrect results.
    a. Syntax
    b. Runtime
    c. Logic
    d. None of the above

24. In compiled language, a syntax error is detected at…
    a. Runtime
    b. Compile time
    c. All of the above
    d. None of the above

25. What is the result of 45 / 4?
    a. 10
    b. 11
    c. 11.25
    d. 12

26. In the expression 45 / 4, the values on the left and right of the / symbol are called…
    a. Operators
    b. Operands
    c. Parameters
    d. Arguments

27. Which of the following expressions results in the value 1?
    a. 2 % 1
    b. 15 % 4
    c. 25 % 5
    d. 37 % 6

28. What is the correct expression for the character 4?
    a. 4
    b. "4"
    c. '4'
    d. None of the above

29. The Unicode value of 'a' is 97. What is the Unicode value for 'c'?
    a. 96
    b. 97
    c. 98
    d. 99

30. Which of the following is the "less than or equal to" comparison operator?
    a. <
    b. <=
    c. =<
    d. <<

31. The value True is…
    a. A language keyword
    b. A Boolean literal
    c. A String literal
    d. None of the above

32. Which of the following Boolean expressions evaluates to False?
    a. (True && (3 >= 4))
    b. !(x > 0) != (x > 0)
    c. (x >= 0) || (x <= 0)
    d. (x != 0) || (x = 0)

33. Which of the following conditionals is *not* considered a loop?
    a. For
    b. If
    c. While
    d. All of the above

34. Analyze the following code fragment:
    ```
    sum = 0
    d = 0
    while (d != 10.1) {
       d += 0.1
       sum += sum + d
    }
    ```
    Which of the following statements is true?
    a. The program does not run because sum and d are not initialized correctly
    b. The program never stops because d is always 0.1 inside the loop
    c. The program may not stop because of the phenomenon of numerical inaccuracy for floating-point numbers
    d. After the loop, the sum is 0 + 0.1 + 0.2 + 0.3 + … + 1.9

35. A function…
    a. must have at least one parameter
    b. may have no parameter
    c. must always have a return statement to return a value
    d. must always have a return statement to return multiple values

36. A variable defined inside a function is referred to as a…
    a. Global variable
    b. Function variable
    c. Block variable
    d. Local variable

37. A variable defined outside a function is referred to as a…
    a. Global variable
    b. Function variable
    c. Block variable
    d. Local variable

38. Whenever possible, avoid the use of…
    a. Global variables
    b. Function variables
    c. Block variables
    d. Local variables

39. The minimum number of temporary variables needed to swap the contents of two variables is…
    a. 0
    b. 1
    c. 2
    d. 3

40. What is the output of the following pseudo-code?
    choice = 2
    Num = 3
    switch (choice) {
       case 1:
          print "Workplace Skills Assessment Program"
          break
       case Num:
          print "I think variables are not allowed in case statements!"
          break
       case (7 – 8 + 3):
          print "What do you think?"
          break
    }
    a. Nothing
    b. "Workplace Skills Assessment Program"
    c. "I think variables are not allowed in case statements!"
    d. "What do you think?"

41. Software that can be used in applications other than one for which it was originally written are called…
    a. Reentrant code
    b. Reusable code
    c. Cross code
    d. Migrant code

42. Which is an example of volatile data storage?
    a. DVD-ROM
    b. RAM
    c. ROM
    d. Hard Disk

43. What is the difference between assignment and initialization?
    a. Assignment may occur many times; initialization may occur exactly once
    b. Assignment may occur exactly once; initialization may occur many times
    c. Both are the same
    d. None of the above

44. The Boolean expression (A && B) && !(A && B) evaluates to…
    a. False in all cases
    b. True in all cases
    c. True when only A is true or only B is true
    d. True when both A is true and B is true

45. The while loop is ideal for loop structures that…
    a. Repeat some process a fixed number of times
    b. Must check the loop conditional before the loop body is executed
    c. Must execute some process at least once
    d. All of the above

46. The Boolean expression (A && B) || A is true…
    a. Only when A is true
    b. Only when B is true
    c. When either A is true or B is true
    d. For all values of A and B

47. In some programming languages, a variable _____ must be used to tell the compiler or interpreter what the data type of the variable.
    a. Name
    b. Termination
    c. Decision
    d. Declaration

48. In a switch statement block, the _____ case executes if none of the other cases were true.
    a. Else
    b. Then
    c. Default
    d. Loop

49. What symbol is used to represent output in a flowchart?
    a. Square
    b. Circle
    c. Parallelogram
    d. Triangle

50. What is commonly used as an assignment operator?
    a. =
    b. *
    c. ^
    d. %