



# 2015 Academic Challenge

## COMPUTER SCIENCE TEST - REGIONAL

This Test Consists of 30 Questions

### Computer Science Test Production Team

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### GENERAL DIRECTIONS

Please read the following instructions carefully. This is a timed test; any instructions from the test supervisor should be followed promptly.

The test supervisor will give instructions for filling in any necessary information on the answer sheet. Most Academic Challenge sites will ask you to indicate your answer to each question by marking an oval that corresponds to the correct answer for that question. Only one oval should be marked to answer each question. Multiple ovals will automatically be graded as an incorrect answer.

Be sure ovals are marked as  , not  ,  ,  , etc.

If you wish to change an answer, erase your first mark completely before marking your new choice.

You are advised to use your time effectively and to work as rapidly as you can without losing accuracy. Do not waste your time on questions that seem too difficult for you. Go on to the other questions, and then come back to the difficult ones later if time remains.

**\*\*\* TIME: 40 MINUTES \*\*\***

**DO NOT OPEN TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO!**

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## WYSE – Academic Challenge

## Computer Science Test (Regional) – 2015

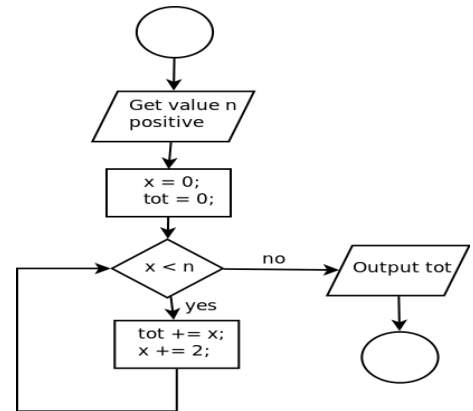
1. Which of the following is NOT a principle of object oriented programming?
  - a. Encapsulation
  - b. Enumeration
  - c. Abstraction
  - d. Polymorphism
  - e. Inheritance
  
2. Which of the following best describes the constructor of a class?
  - a. Code that may be called to set the values of an object.
  - b. Code called when an object loses scope.
  - c. Code executed when an object is created to initialize data elements in the class.
  - d. Code executed by the base class when a derived class is compiled.
  - e. None of the above.
  
3. Which of the following is not a legal designation of a method in the header of the class?
  - a. public
  - b. privileged
  - c. friend
  - d. private
  - e. protected
  
4. Convert the binary number 10010011 to decimal.
  - a. 147
  - b. -102
  - c. 10010011
  - d. 93
  - e. 212
  
5. What is the Boolean expression that matches the given truth table?

|                 | A | B | C | OUTPUT |
|-----------------|---|---|---|--------|
| a. C            | F | F | F | F      |
| b. C or (ABC)'  | F | F | T | T      |
| c. A'C and B'C  | F | T | F | F      |
| d. A'C or B'C   | F | T | T | T      |
| e. A'B'C or A'C | T | F | F | F      |
|                 | T | F | T | T      |
|                 | T | T | F | F      |
|                 | T | T | T | F      |

6. Which of the following is true regarding the XOR (exclusive or) gate/function?
  - a. It is true when both inputs are true.
  - b. It is true when either input is true.
  - c. It is true when both inputs are false.
  - d. It is true when either input is false.
  - e. It is true when the inputs are opposite.

7. Convert the octal (base 8) number 752 to decimal.
- a. 1EA      b. 490      c. 752      d. 111101010      e. None of the above
8. Which of the following is NOT a sorting algorithm?
- a. Radix      b. Bubble      c. Binary      d. Quick      e. Selection
9. Which of the following best describes what is true regarding linked lists and arrays?
- a. A linked list will use more memory than an array when storing the same amount of data.  
 b. An array is generally faster when accessing a specific item in the list.  
 c. Inserting an item into the middle of the list is quicker with a linked list than with an array.  
 d. Deleting an item from the middle of a linked list is quicker than for an array.  
 e. All of the above are true.
10. First in first out (FIFO) is associated with which type of data structure?
- a. Associative Array  
 b. Queue  
 c. Linked List  
 d. Stack  
 e. None of the above

11. What best describes the image to the right?



12. Which of the following best describes what is true regarding traditional platform-based hard drives?
- a. Access time is broken up into two parts a seek time and a transfer time.  
 b. Both seek and transfer time are related to the spin rate of the drive.  
 c. Hard drives are non-volatile methods of data storage.  
 d. Hard drives store data on both sides of the platters.  
 e. All of the above are true.

13. The concept of Net Neutrality can best be described as which of the following?
- Allowing anyone, regardless of race, to use the internet.
  - Insuring that all data packets are sent through the network in a first come first served basis, regardless of the application that is sending or receiving them.
  - Allowing a third party to inspect all data packets on the internet.
  - Allowing companies to share your private data with each other.
  - Insuring that everyone can obtain inexpensive wireless access.
14. Domain Name Service (DNS) can best be described as which below?
- A means of mapping Ethernet addresses to internet addresses.
  - A means of routing internet traffic.
  - A mapping of Uniform Resource Locators (URLs) to internet addresses.
  - A means of identifying services offered by a host.
  - A mapping of computers that are included with a given network.
15. Which of the following is NOT an assignment operator?
- ==
  - +=
  - %=
  - =
  - All are assignment operators.

Use the following code for questions 16, 17, 18, & 19.

```

1      int main()
2      {
3          int i = 0, power = 0;
4          const int max = 10;
5
6          for(i = 0, power = 1; i <= max; i++, power += power)
7              cout << endl << setw(10) << i << setw(10) << power;
8          cout << endl;
9          return 0;
10     }
```

16. What is the last line output?

- 6            64
- 7            128
- 8            256
- 9            512
- 10           1024

17. How many times will line 6 be executed?

- 9
- 10
- 11
- 12
- 1024

18. How many times will line 7 be executed?

- a. 9                      b. 10                      c. 11                      d. 12                      e. 1024

19. What is the purpose of the setw(10) function that is used twice on line 7?

- a. It sets the field width of the next output value.  
 b. It typecasts the next value to a whole number.  
 c. It ensures that any value less than or equal to 10 is output in bold.  
 d. It sets the font color of the next 10 output values to white.  
 e. None of the above.

Use the following code for questions 20, 21, 22, & 23.

```

1      int main() {
2          char input = 0;
3
4          cout << "Make your input: " << endl;
5          cin >> input;
6          switch(input*(input >= 'a' && input <= 'z')) {
7              case 'a':
8              case 'e':
9              case 'i':
10             case 'o':
11             case 'u':
12                 cout << "1";
13                 break;
14             case 0:
15                 cout << "2";
16                 break;
17             default:
18                 cout << "3";
19                 break;
20         }
21         cout << endl;
22         return 0;
23     }
```

20. What will cause a 1 to be output?

- a. The user entered a lowercase vowel.  
 b. The user entered an uppercase consonant.  
 c. The user entered something other than a lowercase letter.  
 d. The user entered a lowercase consonant.  
 e. The user entered something other than an uppercase letter.

21. What will cause a 3 to be output?

- a. The user entered a lowercase vowel.
- b. The user entered an uppercase consonant.
- c. The user entered something other than a lowercase letter.
- d. The user entered a lowercase consonant.
- e. The user entered something other than an uppercase letter.

22. Which line of code can be removed without altering the execution of the code block?

- a. 5
- b. 8
- c. 13
- d. 19
- e. 21

23. Which statement will be executed after the break statement is executed on line 13?

- a. The case statement on line 14.
- b. The cout statement on line 15.
- c. The cout statement on line 18.
- d. The cout statement on line 21.
- e. None of the above.

24. With what would you replace the X with in the following cout statement:

```
cout << "This is a double quote X";
```

so that the following phrase appears on the screen?

```
This is a double quote "
```

- a. "
- b. '
- c. \n
- d. \"
- e. \t

Use the following code for questions 25, 26, & 27.

```
1     int main()
2     {
3         int i = 0;
4         i += 1;
5         cout << i << " ";
6         i = i + 1;
7         cout << i << " ";
8         cout << i++ << " ";
9         cout << ++i << endl;
10
11        return 0;
12    }
```

25. What will be output?

- a. 1 2 3 4
- b. 1 1 3 4
- c. 1 2 2 4
- d. 1 3 3 4
- e. None of the above.

26. What is the line number of the statement that uses the pre-increment operator?

- a. 2
- b. 4
- c. 6
- d. 8
- e. 9

27. Within C++, the statement(s) inside of which type of loop will always be executed at least once?

- a. while
- b. goto
- c. for
- d. do while
- e. None of the above.

28. Which of the following statements will allocate an integer array with 5 elements and set each of the elements to zero:

- a. `int array[] = {0,0,0,0,0};`
- b. `int array[5] = {0};`
- c. `int array[4] = {0,0,0,0,0};`
- d. Both a and c.
- e. Both a and b.

Use the following code for questions 29 & 30.

```

1   int sum=0, total=0, in,i;
2   cout << "Enter a positive int: ";
3   cin  >> in;
4   for (i=0; i<in; i++) {
5       sum  += i++;
6       total++;
7   }
8   cout << total;
```

29. What is displayed by the code if the user enters a 10?

- a. 5
- b. 6
- c. 10
- d. 20
- e. 45

30. Finish the following line so that it best describes the function of the code. This code adds up and displays the \_\_\_\_\_.

- a. sum of all positives less than or equal to the number entered
- b. sum of all positive odd numbers less than number entered
- c. sum of all positive even numbers less than number entered
- d. the number of positive odd numbers less than or equal to the number entered
- e. the number of positive even numbers less than or equal to the number entered