



2012 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 incorrect answers.

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) – 2012

1. Cloud computing can best be defined as:
 - a) another name for the agile system development methodology.
 - b) on-demand access to a shared pool of configurable servers, storage devices, and applications.
 - c) the name of the newest line of supercomputers used for weather forecasting.
 - d) the ability to wirelessly connect multiple computing devices to a central wireless access point.
 - e) None of the above
2. Which of the following is not a function of an operating system?
 - a) Manage resources
 - b) Provide a user interface
 - c) Run applications
 - d) Spell check documents
 - e) An operating system does all of the above functions.
3. Which of the following are solid state storage devices?
 - a) Secure Digital (SD) card
 - b) Flash drive
 - c) 1TB hard drive
 - d) b & c
 - e) a & b
4. Which of the following lists of storage prefixes are listed in order from smallest to largest?
 - a) zetta, exa, peta, tera, giga, mega, kilo
 - b) kilo, mega, tera, peta, giga, zetta, exa
 - c) kilo, mega, giga, tera, peta, exa, zetta
 - d) zetta, kilo, giga, mega, exa, peta, tera
 - e) kilo, mega, tera, peta, giga, exa, zetta
5. Convert 179 decimal to binary.
 - a) 10110011
 - b) 10010111
 - c) 11001111
 - d) B3
 - e) 10101010
6. Which of the following represents the comparison ($65 < x < 85$) using programming syntax?
 - a) ($x < 85$) || ($x > 65$)
 - b) ($x < 65$) && ($x > 85$)
 - c) ($x > 65$) || ($x < 85$)
 - d) ($x > 65$) && ($x < 85$)
 - e) None of the above.

7. What is the Boolean expression that matches the given truth table?

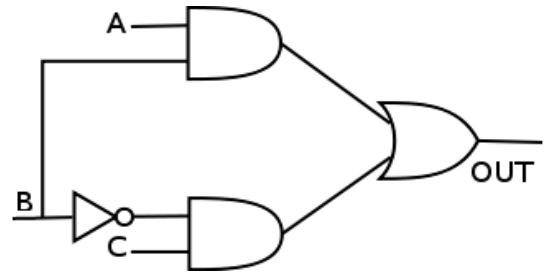
a) $A' \text{ or } (BC)'$	<u>A</u>	<u>B</u>	<u>C</u>	<u>OUTPUT</u>
b) $(A'C') \text{ or } (BC')$	F	F	F	T
c) $(AC)' \text{ or } (BC')$	F	F	T	F
d) $B \text{ or } (AC)'$	F	T	F	T
e) None of the above.	F	T	T	F
	T	F	F	F
	T	F	T	F
	T	T	F	T
	T	T	T	F

8. What is the equivalent value for the, $(A \text{ OR } C') \text{ AND } (B \text{ AND } C')$ if C is FALSE?

- a) $A \text{ AND } B$
- b) TRUE
- c) FALSE
- d) $A \text{ OR } B$
- e) None of the above.

9. What is the value of the output OUT for the following logical circuit when B is FALSE?

- a) TRUE
- b) FALSE
- c) $A \text{ OR } C$
- d) A
- e) C



10. Which of the following is not true regarding a linked list structure (with only a single link)?

- a) A linked list can grow dynamically as the program runs.
- b) Inserting items in the middle of a linked list is generally faster than inserting in the middle of an array.
- c) Link lists make use of pointers.
- d) Jumping to the 10th item in a linked list generally is as fast as jumping to the 10th item in an array.
- e) Deleting items from the front of a linked list is generally faster than deleting from the front of an array.

11. A binary search of a sorted list of 200 items takes at most how many comparisons?

- a) 1
- b) 7
- c) 8
- d) 100
- e) 200

12. Which of the following data structures is described as Last In First Out (LIFO)?

- a) Queue
- b) Stack
- c) Tree
- d) Hash Tables
- e) Linked List

```
// *** Use the following code for questions 13, 14, 15 & 16 *** //
char c = 'X', d = '1', *c_ = &d;

c = 'y';
cout << *c_ << *c_ << endl;
c = 'Y';
cout << *c_;
c_ = &c;
d = 'Z';
cout << *c_ << *c_ << *c_ << endl;
```

13. What is the type of the variable `c_`?
- a) char b) pointer c) string d) array of char e) integer
14. What is the type of the variable `c`?
- a) char b) pointer c) string d) array of char e) integer
15. What will be printed on the first line of system output from the `cout` statements?
- a) yy b) YY c) yyy d) 11 e) ZZ
16. What will be printed on the last line of system output from the `cout` statements?
- a) 1YYY b) YZZZ c) 1ZZZ d) ZZZ e) YYY

```
// *** Use the following code for questions 17, 18, 19 & 20 *** //
const int MAX_SIZE = 4;
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int e[MAX_SIZE];
int numb = 4;
int j=0;
int i;

for (i=0;i<MAX_SIZE;i++) {            // this line is for problem 17
    e[i] = 0;
}

e[++j] = a;
e[++j] = b;
e[j++] = c;
e[j] = d;

for (i=0;i<MAX_SIZE;i++) {
    cout << e[i];
}
```

17. How many times will the above for loop execute?
- a) 0 b) 2 c) 4 d) 5 e) 6
18. How many elements are in the array e[]?
- a) 1 b) 4 c) 5 d) 82 e) Unknown
19. How many times is the value of the first element in the array e[] changed after the array has been declared?
- a) 0 b) 1 c) 2 d) 4 e) 9
20. What will be output from this code?
- a) 0134 b) 12345 c) 0123 d) 1234 e) 2345

```
// *** Use the following code for questions 21, 22, 23, & 24 *** //
int i=0;
char days [7][10] = {"Sunday", "Monday", "Tuesday", "Wednesday", "Thursday",
                    "Friday", "Saturday" };
while (i < 7) {
    cout << days[i][i++];
}
```

21. How many dimensions does the array have?
- a) 7 b) 10 c) 2 d) 3 e) infinite
22. What would be the correct syntax to use a for loop instead of a while to produce the same result?
- a) for (i=0;i<=7;++i)
 b) for (i<7)
 c) for (i=1;i<7;i++)
 d) for (i=0;i<=7;i++)
 e) for (i=0;i<7;i++)
23. What will be output from the program?
- a) Nothing—will cause a syntax error
 b) soensya
 c) Soensya
 d) Sunday
 e) Soeedyy

24. If the statement `cout << days[3];` is placed after the while loop, what will it output?

- a) Nothing—will cause a syntax error
- b) Nothing—will cause a runtime error
- c) Tuesday
- d) Wednesday
- e) Thursday

```
// *** Use the following code for questions 25, 26, 27 & 28 *** //
int my_func (const char a[]) {
    int i = 0;
    while (a[i] != '\0')
        i++;
    return i;
}

int main() {
    cout << my_func("Hello");
    return 0;
}
```

25. In `my_func`, what type of variable is `a`?

- a) string
- b) character
- c) int
- d) float
- e) `a` does not have a type

26. In `my_func`, what does `'\0'` represent?

- a) null
- b) zero
- c) space
- d) blank
- e) nothing

27. In the `main` function, what is `"Hello"`?

- a) comment
- b) character constant
- c) C++ instruction
- d) function call
- e) string constant

28. What will be output from this program?

- a) Hello
- b) 0
- c) \0
- d) 5
- e) 6

```
// ***** Code used on problems 29 and 30 *****//
1 > class person {
2 >     private:
3 >         string name;
4 >         int age;
5 >     public:
6 >         person()          { name="DEFAULT NAME"; age=20; };
7 >         void setAge (int a) { age = (a<0) ? 1: a; };
8 >         void setName(string s) { name = s; };
9 >         int  getAge ()   const { return age; };
10>        string getName() const { return name; };
11>        bool operator> (const person &right) const {
12>            return (name>right.name || name == right.name && age > right.age);
13>        };
14>        person operator++(int);
15> }; // end of person class
16>
17> person person::operator++(int) {
18>     person temp = *this;
19>     age++;
20>     return temp;
21> } // end ++ operator
```

29. Given P is declared as follows, which of the statements below sets the name of the person P to "Joe" and then sets the age to 18?

Person P;

- a) age = 18; name = "Joe";
- b) P.age = 18; P.name = "Joe";
- c) P.setAge(18); P.setName("Joe");
- d) P = "Joe" + 18;
- e) All of the above.

30. The code for the > and ++ is an example of which?

- a) Operator overloading
- b) Inheritance
- c) Principle of least privilege
- d) Encapsulation
- e) A default constructor