

2004 State Convention Computer Programming Test Multiple Choice Section

This section of the computer programming test will consist of 10 multiple choice problems. Each problem will be scored according to standard FAMAT rules for multiple choice tests (4 points for a correct answer, 0 for no answer, and -1 for an incorrect answer). When time is called the judge will pick up the answer sheets from each team. Each team must surrender their answer sheet **immediately** upon being asked by the judge. Any team that is determined to have answered any questions after time is called will be disqualified.

Your team's score on this section will be added to your score on the programming section. That sum will be your total score and will be used to determine your rank in the competition. The standard FAMAT tiebreaker method will be used to break any ties.

- 1) No calculators are permitted.
- 2) Your team may write a program to assist in determining the correct answer.
- 3) All the rules for the programming section apply for any program you use.
- 4) You **may not** use a different computer or keyboard for this section.
- 5) NOTA is an acronym for "none of the above".

1. What is the binary 8-bit 2's complement of 54 and -24?

- | | 54 | -24 |
|----|----------|----------|
| A) | 00110110 | 11101000 |
| B) | 00110110 | 11100111 |
| C) | 00110110 | 10011000 |
| D) | 00110111 | 11100111 |
| E) | NOTA | |

2. What year was the first Bulletin Board System (BBS) activated?

- A) 1975
- B) 1978
- C) 1981
- D) 1985
- E) NOTA

3. Who developed the UNIX operating system?

- A) It's open source
- B) IBM
- C) Bell Laboratories
- D) Harvard University
- E) NOTA

4. What game was played as the earliest graphical computer game known to exist?

- A) Pong
- B) Tic-Tac-Toe
- C) Checkers
- D) Chase
- E) NOTA

5. How many bits are in a gigabyte?

- A) 1, 073, 741, 824
- B) 1, 000, 000, 000
- C) 8, 589, 934, 592
- D) 8, 000, 000, 000
- E) NOTA

6. What is the probability that the following function will return true if it is called as `func(100)`? The `rand()` function will return an integer between 1 and 10, inclusive, with equal probability.

```
bool func(int n)
{
    int count = 0;
    int value = 0;
    while(count < n)
    {
        value = value + rand();
        int inside = n/5;
        while(inside > 0)
        {
            inside = inside - 1;
            count = count + 1;
        }
    }
    return (value < 10);
}
```

- A) 0.00011
 B) 0.00081
 C) 0
 D) 0.00121
 E) NOTA
7. What is the expected run-time of the function in the previous problem?
- A) $O(n)$
 B) $O(n^2)$
 C) $O(\log n)$
 D) $O(1)$
 E) NOTA
8. Which of the following Boolean algebra expressions is equivalent to $\sim(A \vee B) \wedge (A \vee \sim B) \wedge (A \vee (A \wedge B))$?
- A) $\sim A \vee \sim B \wedge (A \vee \sim B) \wedge A$
 B) $\sim A \vee \sim B \wedge A \vee \sim B \wedge A \vee A \wedge B$
 C) $\sim A \wedge \sim B \wedge \sim(\sim A \wedge B) \wedge A \wedge B$
 D) $\sim A \wedge \sim B \wedge \sim(\sim A \wedge B) \wedge A \vee B$
 E) NOTA

9. What is the expected run-time of the following function?

```
bool func(int n)
{
    int count = 0;
    int value = 0;
    while(count < n)
    {
        value = value + rand();
        int inside = n/5;
        while(inside > 0)
        {
            inside = inside - 1;
        }
        count = count + 1;
    }
    return (value < 10);
}
```

- A) $O(n)$
- B) $O(n^2)$
- C) $O(\log n)$
- D) $O(1)$
- E) NOTA

10. What is the storage unit called that a processor uses for all basic operations?

- A) Memory
- B) Cache
- C) Hard Drive
- D) Register
- E) NOTA