

(皆為單選題)
每題 4 分

- Which of the following is a black-box testing approach?
 - Basis path testing
 - Condition testing
 - Data flow testing
 - Random testing
 - All of the above
- A 2D array $X[1\dots 10][1\dots 100]$ is declared in a program. The address of $X[1][1]$ is 1200, and the size of each element of the array is 4. What address of $X[3][2]$ is if the memory system uses row-major storage?
 - 1232
 - 1264
 - 1328
 - 2408
 - None of the above
- In the theory of computation, the halting problem states that,
 - All problems can be solved by one of the Turing machines.
 - can we write a program that tests whether or not any program, represented by its Gödel number, will terminate?
 - if an algorithm exists to do a symbol manipulation task, then a Turing machine exists to do a task.
 - the solvable problems can themselves be divided into two categories: polynomial and non-polynomial problems
 - None of the above
- Consider the C program on the right side. What will be printed on the standard output after the program finishes?


```

            struct point { int x; int y;};

            int main() {
                struct point p, q;
                struct point *r;
                r = &q;
                q.x = p.y = 1;
                q.y = p.x = 2;
                r->x = 2;
                p.y=1;
                printf("%d, %d", q.x, q.y);
                return 0;
            }
            
```

 - 2, 2
 - 2, 1
 - 1, 2
 - 1, 1
 - None of the above
- What is the top element of Stack S after execution of the pseudocode program on the right side?


```

            Stack(S); // create a stack S
            Queue(Q); // create a queue Q
            Push (S,1); Push(S,2);
            Push (S,3); Push (S,4);
            Enqueue(Q,5); Enqueue(Q,6);
            For (i=1 to 4) {
                x=Pop (S);
                Enqueue(Q,x);
            }
            For (i=1 to 6) {
                x=Dequeue (Q);
                Push(S,x);
            }
            
```

 - 4
 - 3
 - 2
 - 1
 - None of the above
- Assume (假設) a computer system uses 7 bits to store a signed integer in two's complement format. Then $(0010010)_2 - (0111010)_2 = ?$
 - $(1011000)_2$
 - $(1001100)_2$
 - $(1110101)_2$
 - Overflow
 - None of the above

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7. Which of the following is used by JPEG (Joint Photographic Experts Group) image format?
- A. the indexed color scheme
 - B. vector image encoding method
 - C. the true-color scheme
 - D. a combination of geometrical shapes
 - E. None of the above

8. Assume a computer uses pipelining of 9 stages. Each stage demands 3 clock cycles to finish its task. How many clock cycles are need to execute 11 independent (不相關的) instructions?
- A. 33
 - B. 297
 - C. 57
 - D. 19
 - E. None of the above

9. Consider the C++ program on the right side.
What result will be shown on the standard output?

- A. abab
- B. bbab
- C. bbbb
- D. abbb
- E. The program cannot compile

<pre>#include <iostream> class A { public: virtual void f() {std::cout << "a";} }; class B: public A { public: void f() {std::cout << "b";} };</pre>	<pre>int main () { A a; B b; A* aptr=&b; B* bptr =&b; (*aptr).f(); (*bptr).f(); aptr->f(); bptr->f(); return 0; }</pre>
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10. A programmer develops a new class, namely Obj. She/he wants to overload the C++ operators “<<” and “>>” to support standard I/O for the new class Obj. She/he may use the following techniques:

1. overload the two C++ operators as friend, global functions to the class Obj.
2. overload the two C++ operators as member functions in class Obj.
3. overload the two C++ operators in classes ostream and istream.

Which of the following is a better solution?

- A. choice 3 or choice 2
- B. choice 1 or choice 2
- C. choice 3
- D. choice 2
- E. choice 1

11. Which of the following is not a sentence in a propositional logic?

- A. He is a teacher
- B. Where is Harry
- C. Today is raining
- D. False
- E. If a dog is a mammal then Harry is a mammal

12. LISP and Scheme are

- A. procedural languages
- B. imperative languages
- C. object-oriented languages
- D. functional languages
- E. declarative languages

13. Which of the following is required in multiprogramming?

- A. a time-sharing operating system
- B. a batch operating system
- C. an object-oriented operating system
- D. a virtual memory system
- E. a database management system

14. How many bits are used in an IPv4 address?

- A. 4
- B. 8
- C. 16
- D. 32
- E. 48

15. Denial of service (DoS) is a type of attack that threatens _____

- A. integrity
- B. availability
- C. confidentiality
- D. compatibility
- E. modularity

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16. Which of the following is *not* true about searching algorithms and their efficiency?
- The major difference between various searching algorithms is the amount of effort they require to complete the search.
 - Big O notation is one way to describe how likely it is that a searching algorithm will find its target.
 - The effort required to perform a search or a sort is particularly dependent on the number of data elements.
 - A more efficient searching algorithm is usually more complex and difficult to implement.
17. The choice of which sorting algorithm to use does not affect:
- How thoroughly sorted the vector will be.
 - The time it takes for the sorting operation to complete.
 - The amount of memory used by the program.
 - All of the above will be affected by the choice of sorting algorithm.
18. A queue performs the following commands (in pseudo-code):
- ```
enqueue 4, 6, 8, 3, 1
dequeue three elements
enqueue 3, 1, 5, 6
dequeue two elements
```
- What number is now at the front of the queue?
- 3.
  - 4.
  - 5.
  - 6.
19. Select the false statement regarding inheritance.
- A derived class can contain more attributes and behaviors than its base class.
  - A derived class can be the base class for other derived classes.
  - Some derived classes can have multiple base classes.
  - Base classes are usually more specific than derived classes.
20. protected base class members cannot be accessed by:
- Functions that are neither friends of the base class, derived-class member functions nor friends of a derived class.
  - friends of the base class.
  - Functions that are not derived-class member functions.
  - friends of derived classes.
21. Employee is a base class and HourlyWorker is a derived class, with a redefined non-virtual print function. Given the following statements, will the output of the two print function calls be identical?
- ```
HourlyWorker h;
Employee *ePtr = &h;

ePtr->print();
ePtr->Employee::print();
```
- Yes.
 - Yes, if print is a static function.
 - No.
 - It would depend on the implementation of the print function.

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22. Which of the following assignments would be a compilation error?
- Assigning the address of a base-class object to a base-class pointer.
 - Assigning the address of a base-class object to a derived-class pointer.
 - Assigning the address of a derived-class object to a base-class pointer.
 - Assigning the address of a derived-class object to a derived-class pointer.
23. Assuming that t is an array and tPtr is a pointer to that array, which expression refers to the address of element 3 of the array?
- $*(tPtr + 3)$.
 - $tPtr[3]$.
 - $\&t[3]$.
 - $*(t + 3)$.
24. Which of the following does not declare a 2-by-2 array and set all four of its elements to 0?
- ```
int b[2][2];
b[0][0] = b[0][1] = b[1][0] = b[1][1] = 0;
```
  - ```
int b[2][2] = {0};
```
 - ```
int b[2][2];
for (int i = 0; i < 2; i++)
 for (int j = 0; j < 2; j++)
 b[i][j] = 0;
```
  - All of the above initialize all four of the array elements to 0.
25. A stack is initially empty, then the following commands are performed:
- ```
push 5
push 7
pop
push 10
push 5
pop
```

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Which of the following is the correct stack after those commands (assume the top of the stack is on the left)?

- 5 10 7 5.
- 5 10.
- 7 5.
- 10 5.

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