

1. What is the output from the following code assuming `&a = 100` and `&aPtr = 200`?

```
int a = 3;
int *aPtr = &a;
int **aPtrPtr = &aPtr;

cout << *aPtr << " ";
cout << aPtrPtr << " ";
cout << *aPtrPtr << " ";
cout << **aPtrPtr << endl;
```

- (a) 3 200 100 3
- (b) 3 100 200 100
- (c) 100 200 100 100
- (d) 100 200 100 3
- (e) None of the above.

2. Given the following functions:

```
int f_A( int a )
{
    return a + 2;
}

int f_B( int a )
{
    return a + 3;
}

int f_C( int a )
{
    return a + 4;
}
```

What is the output from the following code?

```
int sum = 0;
int ( *f[ 3 ] )( int ) = { f_A, f_B, f_C };
for ( int x = 0; x < 3; x++ )
{
    sum += ( *f[ x ] )( x );
}
cout << sum << endl;
```

- (a) 3
- (b) 12
- (c) 6
- (d) 9
- (e) None of the above.

3. Given the following code, what are contents of `v2`?

```
vector< int > v1, v2;
for( int x = 1; x <= 5; x++ )
```

```

{
    v1.push_back( x );
}

vector< int >::reverse_iterator myReverse;
for( myReverse = v1.rbegin();
    myReverse != v1.rend();
    myReverse++ )
{
    if( *myReverse % 2 == 0 )
    {
        v2.push_back( *myReverse );
    }
}
cout << v2[ 0 ];

```

- (a) 5
- (b) 4
- (c) 3
- (d) 2
- (e) None of the above.

4. In VC++.NET 2005, which of the following is true?

- (a) Reference types can inherit from COM coclasses.
- (b) Value types can inherit from native types.
- (c) Native types can inherit from value types.
- (d) COM coclasses can inherit from reference types.
- (e) None of the above.

5. Which of these is not one of K|V model's four stages of trading system development?

- (a) Back Test
- (b) Manage Portfolio and Risk
- (c) Research and Document Calculations
- (d) Implement
- (e) None of the above.

For Questions 6 and 7, assume a database with the following schema and data:

“Stocks” Table:

StockSymbol	CurrentPrice
IBM	83.70
GM	36.83
MSFT	26.16
AMZN	38.17
MCD	30.85

“Trades” Table:

TradeID	StockSymbol	BuySell	Quantity	Price
001	MSFT	B	1000	82.55
002	MSFT	S	1000	83.25
003	MCD	B	1500	31.46
004	GM	S	2000	39.51
005	AMZN	B	1000	39.42

6. What data would the following SQL statement do?

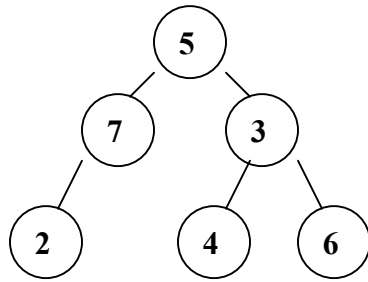
```
SELECT Trades.StockSymbol, Trades.Price, Stocks.CurrentPrice
FROM Trades
INNER JOIN Stocks
ON Trades.StockSymbol = Stocks.StockSymbol
```

- (a) Returns the symbol, the trade price and the current price for each stocks.
- (b) Returns the symbol, the trade price and the current price for each trade.
- (c) Returns the symbol, the trade price and the current price for only those stocks that have been traded.
- (d) Returns the symbols, and all the trade prices and the current prices by symbol for each stock.
- (e) None of the above.

7. Which SQL statement would you use to insert a new trade?

- (a) INSERT INTO Trades VALUES('006', 'AMZN', 'S', 1000, 38.17)
- (b) INSERT ROW INTO Trades VALUES('006', 'AMZN', 'S', 1000, 38.17)
- (c) INSERT VALUES('006', 'AMZN', 'S', 1000, 38.17) INTO Trades
- (d) INSERT VALUES('006', 'AMZN', 'S', 1000, 38.17) AS ROW INTO Trades
- (e) None of the above.

8. Given the following tree structure with nodes:



```
struct Node
{
    int Value;
    Node *Right;
    Node *Left;
}
```

What is the return value of the following function, where root points to the tree?

```
int NodeSum( Node *root )
{
    if( root == NULL )
    {
        return 0;
    }
    else
    {
        return root->Value + NodeSum( root->Right )
            - NodeSum( root->Left );
    }
}
```

- (a) 2
- (b) 5
- (c) 7
- (d) 6
- (e) None of the above.

9. In .NET 2005, which of the following is false regarding threading?

- (a) Aborting a Thread will cause an exception to be raised in that thread.
- (b) Background threads will only run when the foreground thread is idle.
- (c) Mutexes queue threads and ensure they will execute a block of code in proper sequence.
- (d) A deadlock happens when two threads stop responding because each is waiting for the other to finish.
- (e) None of the above is false.

10. In .NET 2005, when using Platform Invoke Services, which of the following is false?

- (a) Blittable types do not create additional overhead.
- (b) Using PInvoke has an overhead of 10 to 30x86 instructions per call.
- (c) Through an RCW, native objects will look and feel like managed ones.
- (d) To invoke a native function, we can supply an ordinal entry point.
- (e) None of the above.

11. What is the intent of the Observer design pattern?

- (a) To define a one-to-many dependency between objects so that when one object changes state, all of its dependents are notified and updated automatically.
- (b) To define an interfacier for creating an object, but let subclasses decide which class to instantiate.
- (c) To encapsulate a request as an object, thereby letting you parameterize clients with different requests.
- (d) Given a language, to define a representation for its grammar along with an interpreter that uses the representation to interpret sentences in the language.
- (e) None of the above.

12. With respect to TCP/IP and UDP, which of the following is false?

- (a) IP is a network layer protocol and is responsible for transporting data between network devices.
- (b) TCP functions at the transport layer of the OSI model and is a connection-oriented protocol that uses IP as its network protocol.
- (c) UDP operates at the transport layer of the OSI model and performs functions similar to that of TCP, except that UDP is a connectionless protocol and does not guarantee delivery.
- (d) TCP adds flow control, sequencing and error detection and correction and guarantees delivery.
- (e) None of the above.

13. Regarding financial industry APIs, which is false?

- (a) No single API connects to all exchanges.
- (b) APIs enable us to access exchange data and enter orders.
- (c) Trading system software can be a kind of middleware between APIs.
- (d) Use of third party APIs alleviates the need to periodically update direct exchange API connections.
- (e) None of the above.

14. Regarding XML, which of the following is false?

- (a) XML validation is order sensitive and elements must appear in the same order as they are specified in the DTD.
- (b) A parser using SAX will notify our application via an API after the XML document has been validated.
- (c) A parser that has access to a DTD guarantees that all the required elements and attributes are present in an XML document according to the DTD.
- (d) A parser using DOM reads the entire XML document into a hierarchical tree structure.
- (e) None of the above.

15. Which of the following is false regarding black-box software testing?

- (a) Black-box testing attempts to find incorrect or missing functions.
- (b) Black-box testing attempts to find errors in data structures or database access.
- (c) Black-box testing tends to be applied during later stages of testing.
- (d) Black-box testing focuses on the information domain.
- (e) None of the above.

16. Given the following function:

```
double bonds_price_discrete( const vector< double > &times,
                             const vector< double > &cashflows,
                             const double &r )
{
    double p = 0;
    for ( int i = 0; i < times.size(); i++ )
    {
        ...
    }
    return p;
};
```

The ... should be replaced by which line of code?

- (a) `p += cashflows[i] / pow((1 + r), times[i]);`
- (b) `p += cashflows.get(i) / pow((1 + r), times.get(i));`
- (c) `p += (*cashflows)[i] / pow((1 + r), (*cashflows)[i]);`
- (d) `p += cashflows->get(i) / pow((1 + r), times->get(i));`
- (e) None of the above.

17. Which is a benefit of using a virtual function?

- (a) Virtual functions allow access overloaded member functions.
- (b) Virtual functions allow declaration of const methods in template classes.
- (c) Virtual functions allow static class methods to be accessed as instance methods.
- (d) Virtual functions allow base pointer to be used and yet the proper derived class functions to be called.
- (e) None of the above.

18. Testing the functionality of an automated trading system requires...

- (a) A simulated electronic market environment to test order execution and updates.
- (b) A simulated electronic market environment to test price updates.
- (c) A simulated electronic market environment to test fill confirmations.
- (d) All of the above.
- (e) None of the above.

19. In C++, which are true regarding binding?

- I.) In late, or runtime, binding the address of the functions are determined at runtime rather than at compile time.
- II.) In early, or compile time, binding the address of the functions are determined at compile time rather than at run time.
- III.) Static binding in C++ is achieved through operator overloading where the compiler decides which function to invoke during compile time itself.
- IV.) Runtime binding is achieved through virtual functions. In case of polymorphism, if a base class pointer is allocated, a pointer of derived class the actual function called is determined only during runtime through the virtual table entry.

- (a) I. and II.
- (b) I. and III.
- (c) I., II. and III.
- (d) I., II. and IV.
- (e) All of the above.

20. Which is false regarding FIX?

- (a) A FIX engine is a piece of software that creates and parses outgoing and incoming messages.
- (b) One of the disadvantages of FIX is that it is slower than other protocols.
- (c) FIX is a global language for automated trading of securities and derivative.
- (d) FIX is a non-XML messaging protocol.
- (e) All of the above.