



# C++ CERTIFIED ASSOCIATE PROGRAMMER - CPA

Sample Exam Questions



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## Question 1

What is the output of the following program?

```
#include <iostream>
using namespace std;
int main(void) {
    int i = 1, j = 2;
    if(i > j && j > i)
        i++;
    if(i > j || j > i)
        j++;
    if(i | j)
        i++;
    if(i & j)
        j++;
    cout << i * j << endl;
    return 0;
}
```

- A. 2
- B. 3
- C. 6
- D. 8

## Question 2

What is the output of the following program?

```
#include <iostream>
using namespace std;
struct A {
    int a;
    float b;
};
struct B {
    int b;
    float a;
};
struct C {
    A a; B b;
};
int main(void) {
    C c1 = {1, 2, 3, 4}, c2 = {5, 6, 7, 8};
    cout << c1.b.a + c2.a.b << endl;
    return 0;
}
```

- A. 6
- B. 8
- C. 10
- D. 12

### Question 3

What is the output of the following program?

```
#include <iostream>
using namespace std;
int main(void) {
    int t[4] = { 8, 4, 2, 1 };
    int *p1 = t + 2, *p2 = p1 - 1;
    p1++;
    cout << *p1 - t[p1 - p2] << endl;
    return 0;
}
```

- A. -2
- B. -1
- C. 1
- D. 2

## Question 4

What is the output of the following program?

```
#include <iostream>
using namespace std;
int fun1(int p) {
    ++p;
    return p++;
}
int fun2(int &p) {
    ++p;
    return p++;
}

int main(void) {
    int a = 1, b, c;
    b = fun1(a);
    c = fun2(b);
    cout << a + b + c << endl;
    return 0;
}
```

- A. 4
- B. 6
- C. 8
- D. 10

## Question 5

What is the output of the following program?

```
#include <iostream>
using namespace std;
int *fun(void) {
    return new int[2];
}
int fun(int *p) {
    delete [] p;
    return 0;
}
void fun(int *p, int q) {
    p[q] *= 2;
}
void fun(int *p, int q, int r) {
    p[q] = r;
}

int main(void) {
    int *v = fun();
    fun(v,0,1);
    fun(v,1,2);
    fun(v,0);
    cout << v[1] + v[0] << endl;
    fun(v);
    return 0;
}
```

- A. 1
- B. 2
- C. 3
- D. 4

## Question 6

What is the output of the following program?

```
#include <iostream>
using namespace std;
char f1(char c) {
    return c == 'z' ? 'a' : c + 1;
}
char f2(char &c) {
    c = f1(c);
    return c;
}
int main(void) {
    char x = 'x';
    cout << f2(x);
    cout << f2(x);
    cout << f2(x) << endl;
    return 0;
}
```

- A. XYZ
- B. xyz
- C. YZA
- D. yza

## Question 7

What is the output of the following program?

```
#include <iostream>
using namespace std;
int main(void) {
    int *t[2] = { new int[2], new int[2] };
    for(int i = 0; i < 4; i++)
        t[i % 2][i / 2] = i;
    cout << t[0][1] + t[1][0] << endl;
    delete [] t[0];
    delete [] t[1];
    return 0;
}
```

- A. 1
- B. 2
- C. 3
- D. 4



## Question 8

What is the output of the following program?

```
#include <iostream>
#include <string>
using namespace std;
int main(void) {
    string s = "Abc", t = "A";
    s = s + t;
    t = t + s;
    int i = s.compare(t) > 0;
    int j = s.length() < t.length();
    cout << i + j << endl;
    return 0;
}
```

- A. 0
- B. 1
- C. 2
- D. 3

## Question 9

What is the output of the following program?

```
#include <iostream>
using namespace std;
namespace alpha { int var = 1; }
namespace beta { int var = alpha::var + 1; }
int main(void) {
    beta::var += alpha::var;
    {
        using namespace beta;
        cout << var << endl;
    }
    return 0;
}
```

- A. 1
- B. 2
- C. 3
- D. 4

## Question 10

What is the output of the following program?

```
#include <iostream>
using namespace std;
class A {
    int a;
public:
    A(void) { a = 1; }
    int b(void) { return ++a; }
};

int main(void) {
    A a;
    a.b();
    cout << a.b() << endl;
    return 0;
}
```

- A. The program will cause a compilation error
- B. 1
- C. 2
- D. 3

## Question 11

What is the output of the following program?

```
#include <iostream>
using namespace std;
class A {
public:
    A() { a.a = a.b = 1; }
    struct { int a,b; } a;
    int b(void);
};
int A::b(void) { int x=a.a;a.a=a.b;a.b=x; return x; };
int main(void) {
    A a;
    a.a.a = 0;
    a.b();
    cout << a.b() << a.a.b << endl;
    return 0;
}
```

- A. The program will cause a compilation error
- B. 10
- C. 01
- D. 11

## Question 12

What is the output of the following program?

```
#include <iostream>
using namespace std;
class A {
public:
    int a;
    A() { a = 0; }
    A(int b) { a = b + 1; }
};
class B {
public:
    A a;
    B() : a(0) { }
};

int main(void) {
    B *b = new B();
    cout << b->a.a << endl;
    return 0;
}
```

- A. The program will cause a compilation error
- B. 1
- C. 3
- D. 5

### Question 13

What is the output of the following program?

```
#include <iostream>
using namespace std;
class A {
public:
    int x;
    void d() { x /= 2; }
};
class B : public A {
public:
    int y;
    void d() { A::d(); }
};
int main(void) {
    B b;
    b.x = b.y = 4;
    b.d();
    cout << b.y / b.x << endl;
    return 0;
}
```

- A. The program will cause a compilation error
- B. 1
- C. 2
- D. 4

## Question 14

What is the output of the following program?

```
#include <iostream>
using namespace std;
class A {
public:
    int work(void) { return 4; }
};
class B : public A {
public:
    int relax(void) { return 2; }
};
class C : public A {
public:
    int relax(void) { return 1; }
};
int main(void) {
    A *a0 = new A, *a1 = new B, *a2 = new C;
    cout << a0 -> work() + static_cast<C*>(a2) -> relax() /
static_cast<B*>(a1) -> relax() << endl;
    return 0;
}
```

- A. The program will cause a compilation error
- B. 1
- C. 2
- D. 4

## Question 15

What is the output of the following program?

```
#include <iostream>
using namespace std;
class B;
class A {
    friend class B;
    int a;
public:    A() : a(4) {}
    void f(B &b,A &a);
    int out(void) { return a; }
};
class B {
    friend class A;
    int b;
public:    B() : b(2) {}
    void f(A &a) { a.a /= b; }
};
void A::f(B &b,A &a){ b.f(*this); }
int main(void) {
    A a;
    B b;
    a.f(b,a);
    cout << a.out() << endl;
    return 0;
}
```

- A. The program will cause a compilation error (or warning in some compilers)
- B. 1
- C. 2
- D. 4



## Question 16

What is the output of the following program?

```
#include <iostream>
using namespace std;
class A {
public: static int a;
        A() { a++; }
};
int A::a = 1;
void f(void) {
    A a;
    throw string("?");
}
int main(void) {
    A a;
    try { f(); }
    catch (string &s) {
    }
    cout << A::a << endl;
    return 0;
}
```

- A. The program will cause a compilation error
- B. 3
- C. 4
- D. 5

## Question 17

What is the output of the following program?

```
#include <iostream>
#include <exception>
#include <stdexcept>
using namespace std;
void f(void) {
    throw domain_error("err");
}
int main(void) {
    int a = 4;
    try { f(); }
    catch (runtime_error &e) {
        a--;
    }
    catch (...) {
        a++;
    }
    cout << a << endl;
    return 0;
}
```

- A. The program will cause a compilation error
- B. 3
- C. 4
- D. 5

## Question 18

What is the output of the following program?

```
#include <iostream>
#include <exception>
using namespace std;
int i = 1;
void f(void) {
    throw 1;
    i++;
}
void g(void) {
    i++;
    try { f(); }
    catch(int &i) {
        throw ++i;
    }
}
int main(void) {
    try { g(); i++; }
    catch(...) { i++; }
    cout << i << endl;
    return 0;
}
```

- A. The program will cause a compilation error
- B. 3
- C. 4
- D. 5

## Question 19

What is the output of the following program?

```
#include <iostream>
#include <exception>
#include <stdexcept>
using namespace std;
int i = 3;
class A : public runtime_error {
public:    A() : runtime_error("?") {}
};
class B : public logic_error {
public:   B() : logic_error("!") {}
};
void f(void) {
    i++;
    throw B();
    i++;
}
void g(void) {
    try { f(); }
    catch(A &a) { throw A(); }
}
int main(void) {
    try { g(); i++; }
    catch(logic_error &l) { i++; }
    catch(...) { i++; }
    cout << i << endl;
    return 0;
}
```

- A. The program will cause a compilation error (or warning in some compilers)
- B. 3
- C. 4
- D. 5

## Question 20

What is the output of the following program?

```
#include <iostream>
using namespace std;
class A {
public:    int v;
    A():v(1) {}
    A(int i):v(i) {}
    void operator&&(int a) { v = -v; }
};
int main(void) {
    A i = 2;
    i && 2;
    cout << i << endl;
    return 0;
}
```

- A. The program will cause a compilation error
- B. 1
- C. 2
- D. 4

## Question 21

What is the output of the following program?

```
#include <iostream>
using namespace std;
class A {
public:    int v;
    A():v(1) {}
    A(int i):v(i) {}
    void operator**(int a) { v *= a; }
};
int main(void) {
    A i = 2;
    i ** 2;
    cout << i.v << endl;
    return 0;
}
```

- A. The program will cause a compilation error
- B. 1
- C. 2
- D. 4

## Question 22

What is the output of the following program?

```
#include <iostream>
using namespace std;
enum e { a=1,b,c,d };
e& operator--(e &x) {
    x = b; return x;
}
int main(void) {
    e f = c;
    cout << int(f--) << endl;
    return 0;
}
```

- A. The program will cause a compilation error (or warning in some compilers)
- B. 1
- C. 3
- D. 4

## ANSWER KEY

1	2	3	4	5	6	7	8	9	10
D	C	B	C	D	D	C	C	C	D
11	12	13	14	15	16	17	18	19	20
B	B	C	D	C	B	D	B	D	A
21	22								
A	A								

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