

Final Exam Questions

CSE 232 (Introduction to Programming II)

1. Which of the following are comments in C++?

- (a) `// This is a comment`
- (b) `/* This is a comment */`
- (c) `/// This is a comment`
- (d) (a) and (b)
- (e) **All of the choices**

2. What is the output of the following?

```
int x = 5;
int y = 9;
cout << (x++ * --y) << endl;
```

- (a) **40**
- (b) 45
- (c) 48
- (d) 54

3. Which of the following statements will print x and y together in one line, and then z in the next line?

- (a) `cout << x << y << endl << z;`
- (b) `cout << x << y << "\n" << z;`
- (c) `cout << x << y << endl; cout << z;`
- (d) (a) and (b)
- (e) **All of the choices**

4. Given the following function declarations, which of the following overloaded functions are valid?

```
void Adventurer();
int Adventurer();

int Arrow(string);
double Arrow(int);

string Knee(string s);
string Knee();
```

- (a) `Adventurer` is overloaded
- (b) `Arrow` is overloaded
- (c) `Knee` is overloaded
- (d) (a) and (c)
- (e) **(b) and (c)**

5. In the example below, which outer most statement does the `break` terminate?

```
for (...) { // For 1
    while (...) { // While 1
    }
    while (...) { // While 2
        switch (...) { // Switch 1
            case 0:
                ...
            default:
                for (...) { // For 2
                    ...
                }
            }
        }
    }
    break
}
```

- (a) For 1
- (b) For 2
- (c) While 1
- (d) **While 2**
- (e) Switch 1

6. What is included when initializing a variable?

- (a) The variable's name
- (b) The variable's type
- (c) The variable's value
- (d) **All of the choices**

7. When can syntax errors occur?

- (a) During runtime
- (b) **During compile time**
- (c) During both runtime or compile time
- (d) During undefined behavior
- (e) None of the choices

8. Which of the following C++ keywords causes a loop to immediately repeat?

- (a) `break`
- (b) **`continue`**
- (c) `repeat`
- (d) `goto`
- (e) `skip`

9. You are given the following function:

```
void func(int &a, int &b) {  
    a = b;  
    b = a;  
}
```

What is the output of the following?

```
int x{5}, y{7};  
func(x, y);  
cout << x << " " << y;
```

- (a) 5 5
- (b) 5 7
- (c) 7 5
- (d) 7 7

10. You are given the following function:

```
double* func() {  
    double d = 3.5;  
    return &d;  
}
```

What is the output of the following?

```
cout << func();
```

- (a) 3.5
- (b) Compile Error
- (c) Undefined Behavior
- (d) Memory Address

11. What is one primary benefit of using the `at()` member function instead of the `[]` operator when accessing elements in a vector?

- (a) `at()` automatically resizes the vector if the index is out of range
- (b) `at()` performs boundary checks and throws an exception if the index is out of range
- (c) `at()` is faster than using the `[]` operator
- (d) All of the choices

12. What is the type of `x` in the following code?

```
const string s = "Blah";  
const string * const ptr = &s;  
auto y = *ptr;  
auto x = &y;
```

- (a) `string`
- (b) `string *`
- (c) `const string`
- (d) `const string *`
- (e) `string &`
- (f) `const string &`

13. What is the output of the following code?

```
string s{"Kripke"};  
cout << s.find('k', 1);
```

- (a) 0
- (b) 1
- (c) 4
- (d) 5
- (e) 0, 4
- (f) 1, 5

14. What is the missing line in the code below, so that it outputs "rome"?

```
string s{"Andromeda"};  
//missing code  
cout << x;
```

- (a) `auto x = s.substr(3, 7);`
- (b) `auto x = s.substr(3, 6);`
- (c) `auto x = s.substr(3, 4);`
- (d) `auto x = s.substr(4, 8);`
- (e) `auto x = s.substr(4, 7);`
- (f) `auto x = s.substr(4, 4);`

15. What does the command `./a < b > c` do when executed at the command line?

- (a) It redirects contents of `b` to be the input for `a`, and redirects the output from `a` into `c`
- (b) It compares the exit code from `a` to the exit code from `b` (less than) and `c` (greater than)
- (c) It compares the sizes of the files of `a` to `b` (less than) and `c` (greater than)
- (d) It runs `a`, then runs `b`, then runs `c`
- (e) This is an invalid command, as none of these are `.out` files

16. Which of the following commands should be executed from the command line to redirect the contents of `a.txt` to be the input for `b.out`, and redirect the output from `b.out` into the input for `c.out`?

- (a) `./b.out < a.txt > c.out`
- (b) `./a.txt > b.out > c.out`
- (c) `./c.out < b.out < a.txt`
- (d) Not possible due to multiple `.out` files

17. What is the missing line in the code below, so that it outputs 7?

```
class MyClass {
public:
    int x;
    MyClass(int val) : x(val) {}
};
```

```
int main() {
    MyClass obj1(5);
    // Missing code
    obj1.x = 7;
    cout << obj2.x;
    return 0;
}
```

- (a) `MyClass obj2 = obj1;`
- (b) `MyClass &obj2 = obj1;`
- (c) `MyClass *obj2 = &obj1;`
- (d) (a) and (b)
- (e) (b) and (c)
- (f) (a) and (c)

18. If an object `obj` is an instance of a class `MyClass`, what is the type of the expression `&obj`?

- (a) `obj`
- (b) `MyClass`
- (c) `obj *`
- (d) `MyClass *`
- (e) `& obj`
- (f) `& MyClass`

19. If an object `obj` is an instance of a class `MyClass`, what is the correct way to declare a pointer to a `obj`?

- (a) `MyClass *ptr = &obj;`
- (b) `obj *ptr = &MyClass;`
- (c) `MyClass *ptr = obj;`
- (d) `obj *ptr = MyClass;`
- (e) `MyClass ptr = *obj;`
- (f) `obj ptr = *MyClass;`

20. Given a class `MyClass`, which of the following correctly declares a vector of `MyClass`?

- (a) `vector<MyClass> v;`
- (b) `MyClass vector v;`
- (c) `vector v<MyClass>;`
- (d) `MyClass v<vector>;`
- (e) `vector MyClass v;`

21. You have a function that takes a container and an index as function parameters, and returns the object stored in the provided container at the provided index. Which of the following exceptions should you check for (and throw) in this function?

- (a) `length_error`
- (b) `logic_error`
- (c) `out_of_range`
- (d) `overflow_error`
- (e) `range_error`

22. Which of the following is true about assertions?
- (a) They can generate compile-time errors
 - (b) A `true` argument results in an error
 - (c) **They are part of the `<cassert>` library**
 - (d) None of the choices
23. Which of the following is an example of a valid HTTPS URL of a repository?
- (a) `https://github.com/user/project.git`
 - (b) `git@github.com:user/project.git`
 - (c) `https://www.github.com/user/project.git`
 - (d) (a) and (b)
 - (e) **(a) and (c)**
 - (f) All of the choices
24. Which of the following is true about a member function that takes a non-const container as function parameter and changes it?
- (a) It should have a return type
 - (b) **It should be a void function**
 - (c) It should be a const function
 - (d) (a) and (c)
 - (e) (b) and (c)
25. How many destructors can a class have?
- (a) None
 - (b) At most one
 - (c) **Exactly one**
 - (d) One or more
26. Which of the following is not true about const functions?
- (a) A const function does not change the object the function belongs to
 - (b) A const function can be called on a const object
 - (c) **A const function cannot be called on a non-const object**
 - (d) (a) and (b)
 - (e) (b) and (c)
 - (f) All of the choices
27. Which of the following is not a part of the rule of five?
- (a) **Constructor**
 - (b) Copy constructor
 - (c) Move constructor
 - (d) Destructor
 - (e) None of the choices
28. Which of the following git commands is used to create a local copy of a remote repository into an empty folder?
- (a) **git clone**
 - (b) git fetch
 - (c) git init
 - (d) git pull
 - (e) (a) and (c)
29. Given a map `m`, what is the type of `result` in the code below?
- ```
auto result = m.insert("C", 9);
```
- (a) `pair <string, int>`
  - (b) `map <string, int>`
  - (c) `pair <string, int> :: iterator, bool`
  - (d) `map <string, int> :: iterator, bool`
  - (e) **`pair <map <string, int> :: iterator, bool>`**
  - (f) `map <pair <string, int> :: iterator, bool>`
30. If the class `YourClass` is declared as a friend class in the class `MyClass`, which of the following is true?
- (a) `MyClass` is allowed to access some private attributes of `YourClass`
  - (b) `YourClass` is allowed to access some private attributes of `MyClass`
  - (c) `MyClass` is allowed to access all private attributes of `YourClass`
  - (d) **`YourClass` is allowed to access all private attributes of `MyClass`**
  - (e) (a) and (b)
  - (f) (c) and (d)



31. Which of the following `vector` member functions are non-const?
- (a) `empty`
  - (b) `clear`
  - (c) `size`
  - (d) `capacity`
  - (e) (a) and (b)
  - (f) All of the choices
32. You have a vector with the capacity of 10, and there are 10 elements in the vector. What would happen if you were to call `reserve(5)` on the vector?
- (a) The vector's capacity will be increased to 15
  - (b) The vector's capacity will be decreased to 5
  - (c) Run-time error, since capacity cannot be reduced
  - (d) `None of the choices`
33. You have a vector with the size of 15; meaning, there are 15 elements in the vector. Which if the following is true, if you were to call `resize(5)` on the vector?
- (a) The vector's size will be reduced to 10
  - (b) The vector's size will be reduced to 5
  - (c) Some elements from the vector will be removed
  - (d) (a) and (c)
  - (e) `(b) and (c)`
  - (f) Run-time error, since this will cause loss of data
34. Which of the following is not true about a friend function?
- (a) `It can only access private data members of a class`
  - (b) It can always access public data members of a class
  - (c) It needs to be declared as a friend function during function declaration
  - (d) (a) and (b)
  - (e) All of the choices
35. Which of the following algorithms change the size of the container that they operate on?
- (a) `remove_if`
  - (b) `shuffle`
  - (c) `transform`
  - (d) (a) and (b)
  - (e) (a) and (c)
  - (f) `None of the choices`
36. What is a `const_iterator` in C++?
- (a) An iterator that allows modification of the container elements, but not itself
  - (b) `An iterator that allows modification of itself, but not the container elements`
  - (c) An iterator that allows modification of neither itself, nor the container elements
  - (d) An iterator that allows modification of both itself, and the container elements
37. Which of the following is not true about iterators?
- (a) A const container can only have const iterators
  - (b) A non-const container can only have non-const iterators
  - (c) A container being const or non-const has no effect on its iterators
  - (d) `(b) and (c)`
  - (e) All of the choices
38. Which of the following containers support iterators with arithmetic functionalities?
- (a) `vector`
  - (b) `list`
  - (c) `map`
  - (d) `set`
  - (e) All of the choices

39. Which of the following is true about containers?

This question was dropped, as it can interpreted in different ways.

- (a) Containers can always store elements
- (b) Containers always support iterators of some form
- (c) Containers can always be resized after initialization
- (d) (a) and (c)
- (e) (b) and (c)
- (f) All of the choices

40. Which of the following may cause an infinite recursion?

- (a) Incorrect for loop
- (b) Incorrect while loop
- (c) **Incorrect base case**
- (d) Incorrect update for counter variable
- (e) All of the choices