

1. Which of the following Unix commands can be used to change a file name? Select 1 answer.

- A. `mv fileA.cxx fileB.cxx`
- B. `rm fileA.cxx fileB.cxx`
- C. `cp fileA.cxx fileB.cxx`
- D. `ls fileA.cxx fileB.cxx`

Your reply: **A**

2. Which value is returned implicitly from the `main()` function in a C++ program, if the `return` statement is not present?

Answer the question using a number only.

Your reply: **0**

3. Considering the following function prototype:

```
int computeValue(int a, int b, int c = 0);
```

which of the following calls will fail at compilation?

Choose at least one answer:

- A. `int value = computeValue(0, 0, 0, 0);`
- B. `int value = computeValue(0, 0);`
- C. `int value = computeValue(0);`
- D. `int value = computeValue(0, 0, 0);`
- E. `int value = computeValue();`

Your reply: **A, C, E**

4. Given the following snippet of code:

```
double resultDensity = 0.0;
for (auto element : elements) {
    resultDensity += element.getDensity();
}
resultDensity = resultDensity / elements.size();
```

Describe shortly what is the content of `resultDensity`. (One sentence should be enough).

Your reply:

**The average density of the elements in the 'elements' vector.**

5. What will be the values of x and y variables after the following instructions? Select 1 answer.

```
int x=1, y=1;
x--;
y++;
y=x;
x--;
y++;
```

- A. x: 1, y: 1
- B. x:-1, y:-1
- C. x: 1, y:-1
- D. x:-1, y: 1

Your reply: **D**

6. What will be the output of the following code ?  
(We suppose that all needed headers are already included.)  
Answer the question using a number only.

```
int sum(int a = 1, int b = 2, int c = 3, int d = 4) {
    return a + b + c + d;
}

int main() {
    int x=2, y=3;
    cout << sum(x, y) << endl;
}
```

Your reply: **12**

7. How many times will the following code print each message?

```
for (int i = 0; i < 10; i++) {
    cout << "Looping over i" << endl;
    if ( i == 1 ) continue;
}
for (int j = 0; j < 10; j++) {
    cout << "Looping over j" << endl;
    if ( j == 1 ) break;
}
```

In your reply write the counts of each message ("Looping over i" first, "Looping over j" second) separated by commas.

Your reply: **10, 2**

8. Which of the statements below is/are correct? Choose at least one answer.

- A. Operator = and != applied on an STL collection iterator return the result whether two iterators represents the same position or not
- B. Operator ++ applied on an STL collection iterator lets the iterator step forward to the next element
- C. Operator == applied on an STL collection iterator assign an iterator (the position of the element to which it refers)
- D. Operator -- applied on an STL collection iterator lets the iterator step backward to the next element
- E. Operator \* applied on an STL collection iterator returns the element of the actual position

Your reply:

9. Let's have: **B, D, E**

```
vector<int> myVector;  
myVector.push_back(1);  
myVector.push_back(2);  
myVector.clear();  
myVector.push_back(3);  
myVector.push_back(4);  
myVector.push_back(3);
```

What will be the value of its first element after the last statement? Answer the question using a number only.

Your reply: **3**

10. For each statement below choose if it is true or false.

- A. The STL vector should be preferred if you need to insert or remove an element in your collection often in the middle.
- B. The STL list should be preferred if you need a to access the N-th element in your collection often.
- C. The STL list should be preferred by default when you need a collection without any specific requirements.
- D. The range-based for loop introduced with C++11 standard can be used with an STL list
- E. The range-based for loop introduced with C++11 standard can be used with an STL vector

Your reply:

- A. **FALSE**
- B. **FALSE**
- C. **FALSE**
- D. **TRUE**
- E. **TRUE**

11. What will the following code print on the screen? Select 1 answer.

```
string name = "Bjarne";  
name += " Stroustrup";  
cout << "Name: " << name << endl;
```

- A. Name: BjarneStroustrup
- B. Name: Bjarne
- C. Name: Stroustrup
- D. Name: Bjarne Stroustrup

Your reply: **D**

12. Which of the statements below is/are correct? Choose at least one answer.

Pointers are variables that refer to other variables.

- a. The pointer type is the same as type of the pointed object.
- b. The pointer type is formed by the type of the pointed object and &
- c. The pointer type is integer (int).
- d. The pointer type is formed by the type of the pointed object and \*

Your reply: **d**

13. What will be the output from the following code ? Select 1 answer.  
(We suppose that all needed headers are already included.)

```
int main()  
{  
    int a = 1;  
    int b = 2;  
    int c = 3;  
    int result = a + b + c;  
    {  
        a = 0;  
        b = 1;  
        c = 2;  
        int result = a + b + c;  
    }  
    cout << result << endl;  
}
```

- A. None, the program will not compile
- B. 9
- C. 6
- D. 3

Your reply: **C**

14. What is Makefile? Select 1 answer.

- A. Makefile is a file that describes to the make command how to build a target program, including compilation.
- B. Makefile is a part of the program code.
- C. Makefile is a part of Qt.
- D. None of the above mentioned.

Your reply: **A**

15. What is the purpose of the following preprocessor commands in a class header. Select 1 answer.

```
#ifndef Car_h
#define Car_h

// Definition of the Car class
class Car
{
// ...
};

#endif
```

- A. They prevent from including the header multiple times.
- B. They have no importance and can be omitted.
- C. They prevent from including the header in the class implementation file.
- D. They make the header file available for the compiler.

Your reply: **A**

16. Which of the statements below is/are correct? Choose at least one answer.

- A. ROOT is a framework for large scale data handling.
- B. ROOT is a C++ framework originally developed for high energy physics.
- C. ROOT is an open source project.
- D. ROOT is a new C++ language standard.

Your reply: **A, B, C**

17. Let's have a class:

```
class Coffee{
public:
    void heat(float degrees);
    float getTemperature();

private:
    float temperature;
};
```

Complete the missing line in the code below to get displayed a changed coffee temperature.  
(We suppose that all needed headers are already included.)

```
Coffee coffee;
?
cout << coffee.getTemperature() << endl;
```

Your reply:

```
coffee.heat(60.); // or any other float number >0. and < 100.
```

18. In order to fetch a repository from a server into your directory using git, which command is necessary. Select 1 answer.

- A. git commit
- B. git push
- C. git clone
- D. git add

Your reply: **C**

19. (2 points) Could you describe:

Which level of the C++ knowledge we have achieved in this course.

Which main features of the C++ language have been covered and which not.

How the knowledge of the C++ language can be useful in scientific projects.

Your reply:

We have achieved a basic to intermediate level of C++ in this course.

The features covered: basic C++ language concepts (variables, types, operator, control constructs, pointers and references), functions, standard library: strings, input/output and collections (vectors), using classes, notion of inheritance (in the context of ROOT).

The features not covered: development of classes, templates, other standard library components than those already mentioned.

C++ can be used for various processing of the experimental data; for example we have worked on processing a sample of nuclear data and produced the plot of the nuclear valley of stability using ROOT.