Python

1_ . What happens when you use the build-in function `any()` on a list?

- [ ] The `any()` function will randomly return any item from the list.
- [x] The `any()` function returns True if any item in the list evaluates to True. Otherwise, it returns False.
- [ ] The `any()` function takes as arguments the list to check inside, and the item to check for. If "any" of the items in the list match the item to check for, the function returns True.
- [ ] The `any()` function returns a Boolean value that answers the question "Are there any items in this list?"

2 .What data structure does a binary tree degenerate to if it isn't balanced properly?

- [x] linked list
- [ ] queue
- [ ] set
- [ ] OrderedDict

3. . What statement about static methods is true?

- [ ] Static methods are called static because they always return `None`.
- [ ] Static methods can be bound to either a class or an instance of a class.
- [x] Static methods serve mostly as utility methods or helper methods, since they can't access or modify a class's state.
- [ ] Static methods can access and modify the state of a class or an instance of a class.

4 . What built-in Python data type is commonly used to represent a stack?

- [ ] `set`
- [X] `list`
- [ ] `None`
- [ ] `dictionary`
- [ ] `You can only build a stack from scratch.`

5 . What is an instance method?

- [x] Instance methods can modify the state of an instance or the state of its parent class.
- [ ] Instance methods hold data related to the instance.

- [ ] An instance method is any class method that doesn't take any arguments.
- [ ] An instance method is a regular function that belongs to a class, but it must return None.

6 . What is the term used to describe items that may be passed into a function?

- [x] arguments
- [ ] paradigms
- [ ] attributes
- [ ] decorators

7 . Which collection type is used to associate values with unique keys?

- [ ] slot
- [X] dictionary
- [ ] queue
- [ ] sorted list

8 . What does calling namedtuple on a collection type return?

- [ ] a generic object class with iterable parameter fields
- [ ] a generic object class with non-iterable named fields
- [ ] a tuple subclass with non-iterable parameter fields
- [x] a tuple subclass with iterable named fields

9 . What symbol(s) do you use to assess equality between two elements?

- [ ] &&
- [ ] =
- [X] ==
- [ ] ||

10 . What is the proper way to write a list comprehension that represents all the keys in this dictionary?

```
fruits = {'Apples': 5, 'Oranges': 3, 'Bananas': 4}
```

- [ ] fruit_names = [x in fruits.keys() for x]
- [ ] fruit_names = for x in fruits.keys() *
- [X] fruit_names = [x for x in fruits.keys()]
- [ ] fruit_names = x for x in fruits.keys()

11 . What is the correct syntax for creating a variable that is bound to a set?

- [X] `my_set = {0, 'apple', 3.5}`
- [ ] `my_set = to_set(0, 'apple', 3.5)`
- [ ] `my_set = (0, 'apple', 3.5).to_set()`
- [ ] `my_set = (0, 'apple', 3.5).set()`

12. . What is the correct syntax for defining an `__init__()` method that takes no parameters?

- []
```
class __init__(self):
    pass
```
- []
```
def __init__():
    pass
```
- []
```
class __init__():
     pass
```
- [X]
```
def __init__(self):
    pass
```

13. Why would you use a decorator?

- [ ] A decorator is similar to a class and should be used if you are doing functional programming instead of object oriented programming.
- [ ] A decorator is a visual indicator to someone reading your code that a portion of your code is critical and should not be changed.
- [x] You use the decorator to alter the functionality of a function without having to modify the functions code.
- [ ] An import statement is preceded by a decorator, python knows to import the most recent version of whatever package or library is being imported.

14. What is a lambda function ?

- [ ] any function that makes use of scientific or mathematical constants, often represented by Greek letters in academic writing
- [ ] a function that get executed when decorators are used
- [ ] any function whose definition is contained within five lines of code or fewer
- [x] a small, anonymous function that can take any number of arguments but has only expression to evaluate

15. What does a generator return?

- [ ] None
- [x] An iterable object
- [ ] A linked list data structure from a non-empty list
- [ ] All the keys of the given dictionary

16. What is the correct way to call a function?

- [X] `get_max_num([57, 99, 31, 18])`
- [ ] `call.(get_max_num)`
- [ ] `def get_max_num([57, 99, 31, 18])`
- [ ] `call.get_max_num([57, 99, 31, 18])`

17. How is comment created?

- [ ] `-- This is a comment`
- [X] `# This is a comment`
- [ ] `/_ This is a comment _\`
- [ ] `// This is a comment`

18. What file is imported to use dates in python?

- [x] datetime
- [ ] dateday
- [ ] daytime
- [ ] timedate

19. Which command will create a list from 10 down to 1? Example:

`[10,9,8,7,6,5,4,3,2,1]`

- [ ] `reversed(list(range(1,11)))`
- [ ] `list(reversed(range(1,10)))`
- [ ] `list(range(10,1,-1))`
- [X] `list(reversed(range(1,11)))`

20. Elements surrounded by `[]` are _, `{}` are _, and `()` are _.

- [ ] sets only; lists or dictionaries; tuples
- [ ] lists; sets only; tuples
- [ ] tuples; sets or lists; dictionaries

- [x] lists; dictionaries or sets; tuples

21. What value would be returned by this check for equality?

5 != 6
[ ] yes
[ ] False
[x] True
[ ] None

22. Which command will create a list from 10 down to 1? Example:

[10,9,8,7,6,5,4,3,2,1]
[ ] reversed(list(range(1,11)))
[ ] list(reversed(range(1,10)))
[ ] list(range(10,1,-1))
[x] list(reversed(range(1,11)))

23. Which Python function allows you to execute Linux shell commands in Python?

[ ] sys.exc_info()
[x] os.system()
[ ] os.getcwd()
[ ] sys.executable

24. Which choice is an immutable data type?

[ ] dictionnary
[ ] list
[ ] set
[x] string

25. Suppose you need to use the sin function from the math library. What is the correct syntax for importing only that function?

[ ] using math.sin
[ ] import math.sin
[x] from math import sin
[ ] import sin from math

26. it is often the case thet the pandas library is used for _ data and NumPy for _ data.

[x] string:numerical
[ ] unstructured:structured
[ ] numerical:tabular
[ ] tabular:numerical

27. If you do not explicitly return a value from a function, what happens?

[ ] If the return keyword is absent, the function will return True.
[ ] The function will enter an infinite loop because it will not know when to stop executing its code.
[ ] The function will return a RuntimeError if you do not return a value.
[x] If the return keyword is absent the function will return None.

28. Which choice is not a native numerical type in Python?

[ ] Long
[ ] Int
[ ] Float
[x] Double

29. What will this statement return?

{x : x*x for x in range(1,100)}

[ ] a dictionary with x as a key, and x squared as its value; from 1 to 100

[x] a dictionary with x as a key, and x squared as its value; from 1 to 99

[ ] a set of tuples, consisting of (x, x squared); from 1 to 99

[ ] a list with all numbers squared from 1 to 99

30. What are the two main data structures in the Pandas library?

[ ] Arrays and DataFrames

[ ] Series and Matrixes

[ ] Matrixes and DataFrames

[x] Series and DataFrames

JAVA
1. How can you achieve runtime polymorphism in Java?
 []method overloading
 []method overrunning
[x] method overriding
 []method calling

2. What is the output of this code?

1: class Main {
2:   public static void main (String[] args) {
3:     int array[] = {1, 2, 3, 4};
4:     for (int i = 0; i < array.size(); i++) {
5:       System.out.print(array[i]);
6:     }
7:   }
8: }
[x] It will not compile because of line 4.
[]It will not compile because of line 3.
[] 123
[]1234

3. What does the following code print?
String str = "abcde";
str.trim();
str.toUpperCase();
str.substring(3, 4);
System.out.println(str);

[] CD
[]CDE
[]D
[x] "abcde"

4. What does this code print?

System.out.print("apple".compareTo("banana"));
[] 0
[] positive number
 [x]negative number
 []compilation error

5. You have an ArrayList of names that you want to sort alphabetically. Which approach would NOT work?
[] names.sort(Comparator.comparing(String::toString))
[] Collections.sort(names)
[x] names.sort(List.DESCENDING)
[]names.stream().sorted((s1, s2) -> s1.compareTo(s2)).collect(Collectors.toList())

6. By implementing encapsulation, you cannot directly access the class's _ properties unless you are writing code inside the class itself.
[x] private
[]protected
[] no-modifier
[] public

7. Fill in the blank to create a piece of code that will tell whether int0 is divisible by 5:
boolean isDivisibleBy5 = _____

[] int0 / 5 ? true: false
[x]int0 % 5 == 0
[] int0 % 5 != 5
[] Math.isDivisible(int0, 5)

8. The runtime system starts your program by calling which function first?
 []print
 []iterative
 []hello
 [x]main

9. Which statement is NOT true?
[]An anonymous class may specify an abstract base class as its base type.
[x]An anonymous class does not require a zero-argument constructor.
[]An anonymous class may specify an interface as its base type.

[]An anonymous class may specify both an abstract class and interface as base types.

10. Object-oriented programming is a style of programming where you organize your program around _ rather than _ and data rather than logic.
 []functions; actions
 [x]objects; actions
 []actions; functions
 []actions; objects

11. What method can be used to create a new instance of an object?
[] another instance
[]field
[x] constructor
[] private method

12. Which is the most reliable expression for testing whether the values of two string variables are the same?
[] string1 == string2
[] string1 = string2
[] string1.matches(string2)
[x]string1.equals(string2)

13. Which are valid keywords in a Java module descriptor (module-info.java)?
 []provides, employs
 []imports, exports
 []consumes, supplies
 [x]requires, exports

14. Which type of variable keeps a constant value once it is assigned?
 []non-static
 []static
 [x]final
 []private

15. What is the result of this code?
char smooch = 'x';
System.out.println((int) smooch);
 []an alphanumeric character
 []a negative number

[x]a positive number
[]a ClassCastException

16. You get a NullPointerException. What is the most likely cause?
[]A file that needs to be opened cannot be found.
[]A network connection has been lost in the middle of communications.
[]Your code has used up all available memory.
[x]The object you are using has not been instantiated.

17. If you encounter UnsupportedClassVersionError it means the code was ___
on a newer version of Java than the JRE ___ it.
[] executed; interpreting
[]executed; compiling
[x]compiled; executing
[]compiled, translating

18. Which keyword lets you call the constructor of a parent class?
[] parent
[x] super
[] this
[] new

19. What is the result of this code?
  1: int a = 1;
  2: int b = 0;
  3: int c = a/b;
  4: System.out.println(c);
[x]It will throw an ArithmeticException.
[]It will run and output 0.
[]It will not compile because of line 3.
[]It will run and output infinity.

20. Normally, to access a static member of a class such as Math.PI, you would
need to specify the class "Math". What would be the best way to allow you to
use simply "PI" in your code?
[x]Add a static import.
[ ]Declare local copies of the constant in your code.
[ ]This cannot be done. You must always qualify references to static members
with the class form which they came from.
[ ] Put the static members in an interface and inherit from that interface.

21. Which keyword lets you use an interface?
 [ ]extends
 [x] implements
 [ ] inherits
 [ ]import

22. Why are ArrayLists better than arrays?
[x] You don't have to decide the size of an ArrayList when you first make it.
[ ] You can put more items into an ArrayList than into an array.
[ ] ArrayLists can hold more kinds of objects than arrays.
[ ] You don't have to decide the type of an ArrayList when you first make it.

23. What language construct serves as a blueprint containing an object's properties and functionality?
[ ] constructor
[ ] instance
[x] class
[ ] method

24. Which is not a java keyword
[ ] finally
[ ] native
[ ]interface
[x] unsigned

25. Which choice is a disadvantage of inheritance?
[ ] Overridden methods of the parent class cannot be reused.
[ ] Responsibilities are not evenly distributed between parent and child classes.
[x] Classes related by inheritance are tightly coupled to each other.
[ ] The internal state of the parent class is accessible to its children.

26. Which access modifier makes variables and methods visible only in the class where they are declared?
[ ] public
[ ] protected
[ ] nonmodifier
[x] private

27. Which code snippet is valid?

[ ] ArrayList<String> words = new ArrayList<String>(){"Hello", "World"};
[ ] ArrayList words = Arrays.asList("Hello", "World");
[ ] ArrayList<String> words = {"Hello", "World"};
[x] ArrayList<String> words = new ArrayList<>(Arrays.asList("Hello", "World"));

28. Which class acts as root class for Java Exception hierarchy?
[ ] Clonable
[x] Throwable
[ ] Object
[ ] Serializable

29. Which statement about constructors is not ture?
[ ] A class can have multiple constructors with a different parameter list.
[ ] You can call another constructor with this or super.
[ ] A constructor does not define a return value.
[x] Every class must explicitly define a constructor without parameters.

30. What will this code print, assuming it is inside the main method of a class?
System.out.println(true && false || true);
System.out.println(false || false && true);
[ ] false \n true
[ ] true \n true
[x] true \n false
[ ] false \n false

31. What will this code print?
List<String> list1 = new ArrayList<>();
list1.add("One");
list1.add("Two");
list1.add("Three");
List<String> list2 = new ArrayList<>();
list2.add("Two");
list1.remove(list2);
System.out.println(list1);
[ ] [Two]
[x] [One, Two, Three]
[ ] [One, Three]
[ ] Two

Machine learning

1. In traditional computer programming, you input commands. What do you input with machine learning?
[ ] patterns
[ ] programs
[ ] rules
[x] data

2. ___ looks at the relationship between predictors and your outcome.
[x] Regression analysis
[ ] K-means clustering
[ ] Big data
[ ] Unsupervised learning

3. What is an example of a commercial application for a machine learning system?
[ ] a data entry system
[ ] a data warehouse system
[ ] a massive data repository
[x] a product recommendation system

4. How is machine learning related to artificial intelligence?
 [ ]Artificial intelligence focuses on classification, while machine learning is about clustering data.
[x] Machine learning is a type of artificial intelligence that relies on learning through data.
[ ] Artificial intelligence is form of unsupervised machine learning.
[ ] Machine learning and artificial intelligence are the same thing.

5. How do machine learning algorithms make more precise predictions?
[ ] The algorithms are typically run more powerful servers.
[x] The algorithms are better at seeing patterns in the data.
[ ] Machine learning servers can host larger databases.
[ ] The algorithms can run on unstructured data.

6. You work for an insurance company. Which machine learning project would add the most value for the company!
[ ] Create an artificial neural network that would host the company directory.
[x] Use machine learning to better predict risk.
[ ] Create an algorithm that consolidates all of your Excel spreadsheets into one data lake.

[ ] Use machine learning and big data to research salary requirements.

7. What is stacking?
[x]The predictions of one model become the inputs another.
[ ]You use different versions of machine learning algorithms.
[ ] You use several machine learning algorithms to boost your results.
[ ] You stack your training set and testing set together.

8. Your company wants you to build an internal email text prediction model to speed up the time that employees spend writing emails. What should you do?
[x] Include training email data from all employees.
[ ] Include training email data from new employees.
[ ] Include training email data from seasoned employees.
[ ]Include training email data from employees who write the majority of internal emails.

9. Self-organizing maps are specialized neural network for which type of machine learning?
[x] semi-supervised learning
[ ] supervised learning
[ ] reinforcement learning
[ ] unsupervised learning

10. In K-nearest neighbor, the closer you are to neighbor, the more likely you are to
[x] share common characteristics
[ ] be part of the root node
[ ] have a Euclidean connection
[ ] be part of the same cluster

11. You work for a large pharmaceutical company whose data science team wants to use unsupervised learning machine algorithms to help discover new drugs. What is an advantage to this approach?
[ ] You will be able to prioritize different classes of drugs, such as antibiotics.
[ ] You can create a training set of drugs you would like to discover.
[x] The algorithms will cluster together drugs that have similar traits.
[ ] Human experts can create classes of drugs to help guide discovery.

12. Naive Bayes looks at each _ predictor and creates a probability that belongs in each class.

[ ] conditional
[ ] multiclass
[x] independent
[ ] binary

13. Someone of your data science team recommends that you use decision trees, naive Bayes and K-nearest neighbor, all at the same time, on the same training data, and then average the results. What is this an example of?
[ ] regression analysis
[ ] unsupervised learning
[ ] high -variance modeling
[x] ensemble modelling

14. The model will be trained with data in one single batch is known as ?
[ ] Batch learning
[ ] Offline learning
[x] Both A and B
[ ] None of the above

15. Which of the following is NOT supervised learning?
[ ] Decision Tree
[ ] Linear Regression
[x] PCA
[ ] Naive Bayesian

16. Compared to the variance of the Maximum Likelihood Estimate (MLE), the variance of the Maximum A Posteriori (MAP) estimate is ___
[ ] Higher
[ ] same
[x] Lower
[ ]it could be any of the above

17. ___ refers to a model that can neither model the training data nor generalize to new data.
[ ] good fitting
[ ] overfitting
[x] underfitting
[ ] all of the above

18. Asian user complains that your company's facial recognition model does not properly identify their facial expressions. What should you do?
[ ] Include Asian faces in your test data and retrain your model.
[ ] Retrain your model with updated hyperparameter values.
[ ] Retrain your model with smaller batch sizes.
[x] Include Asian faces in your training data and retrain your model.

19. (Mostly) whenever we see kernel visualizations online (or some other reference) we are actually seeing:
[x] What kernels extract
[ ] Feature Maps
[ ] How kernels Look

20. The new dataset you have just scraped seems to exhibit lots of missing values. What action will help you minimizing that problem?
[ ] Wise fill-in of controlled random values
[ ] Replace missing values with averaging across all samples
[ ] Remove defective samples
[x]Imputation

21. Which of the following methods can use either as an unsupervised learning or as a dimensionality reduction technique?
[ ] SVM
[x] PCA
[ ] LDA
[ ] TSNE

22. What is the main motivation for using activation functions in ANN?
[x] Capturing complex non-linear patterns
[ ] Transforming continuous values into "ON" (1) or "OFF" (0) values
[ ] Help avoiding the vanishing/exploding gradient problem
[ ] Their ability to activate each neurons individually.

23. Which loss function would fit best in a categorical (discrete) supervised learning ?
[ ] kullback-leibler (KL) loss
[x] Binary Crossentropy
[ ] Mean Squared Error (MSE)
[ ] Any L2 loss

24. You create a decision tree to show whether someone decides to go to the beach. There are three factors in this decision: rainy, overcast, and sunny. What are these three factors called?
[ ] tree nodes
[x] predictors
[ ] root nodes
[ ] deciders

25. You need to quickly label thousands of images to train a model. What should you do?
[ ] Set up a cluster of machines to label the images
[ ] Create a subset of the images and label then yourself
[x] Use naive Bayes to automatically generate labels.
[ ] Hire people to manually label the images

26. You need to select a machine learning process to run a distributed neural network on a mobile application. Which would you choose?
[ ] Scikit-learn
[ ] PyTorch
[x] Tensowflow Lite
[ ] Tensorflow

27. In statistics, what is defined as the probability of a hypothesis test of finding an effect – if there is an effect to be found?
[ ] confidence
[ ] alpha
[x] power
[ ] significance

28. What is lazy learning?
[ ] when the machine learning algorithms do most of the programming
[ ] when you don't do any data scrubbing
[x] when the learning happens continuously
[ ] when you run your computation in one big instance at the beginning

29. What is Q-learning reinforcement learning?
[ ] supervised machine learning with rewards
[ ] a type of unsupervised learning that relies heavily on a well-established model
[ ] a type of reinforcement learning where accuracy degrades over time

[x]a type of reinforcement learning that focuses on rewards

30. What is the difference between unstructured and structured data?
[ ] Unstructured data is always text.
[ ] Unstructured data is much easier to store.
[x] Structured data has clearly defined data types.
[ ] Sturctured data is much more popular.

c++

1.Which of the following operators is overloadable?
[ ] ?:
[x] new
[ ] ::
[ ] .

2. What is an lvalue?
[ ] It's a constant expression, meaning an expression composed of constants and operations.
[x] It's an expression that represents an object with an address.
[ ] It's an expression suitable for the left-hand side operand in a binary operation.
[ ] It's a location value, meaning a memory address suitable for assigning to a pointer or reference.

3. A class template is a _?
[x] class written with the generic programming paradigm, specifying behavior in terms of type parameter rather than specific type.
[ ] blank superclass intended for inheritance and polymorphism.
[ ] lass that only consists of member variable, with no constructor, destructor nor member functions.
[ ] skeleton source code for a class where the programmer has to fill in specific parts to define the data types and algorithms used.

3. Which STL class is the best fit for implementing a collection of data that is always ordered so that the pop operation always gets the greatest of the elements? Suppose you are interested only in push and pop operations.
[ ] std::list
[ ] std::vector
[x] std::priority_queue

[ ] std::map

4. Which statement is true?
[ ] Only classes can have member variables and methods.
[x] C++ supports multiple inheritance.
[ ] C++ supports only single inheritance.
[ ] Only structs can inherit.

5. Consider a pointer to void, named ptr, which has been set to point to a floating point variable g. Which choice is a valid way to dereference ptr to assign its pointed value to a float variable f later in the program?

float g;
void *ptr=&g;

[ ] float f=*(float)ptr;
[ ] float f=(float *)ptr;
[ ] float f=(float)*ptr;
[x] float f=*(float *)ptr;

6. How can C++ code call a C function?
[ ] by simply calling the C code
[ ] there is no way for C++ to call a C function
[x] by using extern "C"
[ ] by importing the source C code

7. What's wrong with this definition when using a pre-C++11 compiler?
std::vector<std::vector<int>> thematrix;
[ ] There's nothing wrong with it.
[ ] An std::vector cannot contain more std::vector containers as its elements.
[ ] The correct syntax should be: std::vector[std::vector[int]] thematrix;
[x] >> is parsed as the shift-right operator, and thus results in a compile error.

8. What is the statement below equivalent to?
sprite->x
[ ] sprite.x
[ ] sprite.*x
[x] (*sprite).x
[ ] *sprite.x

9. What would be the output of this code?
int32_t nums[3]={2,4,3};

std::cout << (nums[0] << nums[1] << nums[2]);
[ ] The output is the addresses of nums[0], nums[1], and nums[2], in that order, with no spaces.
[x] 256
[ ] 0
[ ] 243

10. Which of the following STL classes is the best fit for implementing a phonebook? Suppose each entry contains a name and a phone number, with no duplicates, and you want to have lookup by name.
[ ] std::priority_queue
[ ] std::list
[ ] std::vector
[x] std::map

11. What is the assumed type of a constant represented in the source code as 0.44?
[x] double
[ ] long float
[ ] long double
[ ] float

12. What is an appropriate way of removing my_object as shown below?
        my_class *my_object = new my_class();
[x] delete(my_object);
[ ] free(my_object);
[ ] The garbage collector will destroy the object eventually.
[ ] Exiting the scope will destroy the object.

13. Consider a class named CustomData. Which choice is a correct declaration syntax to overload the postfix ++ operator as a class member?
[ ] CustomData& operator++();
[ ] void operator++(CustomData);
[ ] CustomData operator++(CustomData);
[x] CustomData operator++(int);

14. What is the purpose of a destructor?
[x] It allows the programmer to write the necessary code to free the resources acquired by the object prior to deleting the object itself.
[ ] It deletes an object. One example of a destructor is the delete() function.

[ ] It terminates a program. This may be achieved as a regular function call or as an exception.
[ ] There are no destructors in C++.

15. What is an include guard?
[ ] a preprocessor directive that prevents inconsistent behaviors in lines that contain the #ifdef, #ifndef, or #elif directives
[ ] a compiler option that prevents the user code from including additional libraries
[x] a preprocessor statement that prevents a source file from being included more than once in a project
[ ] a library that adds safety features such as mutexes, watchdog timers, and assertions to the project

16. What is a variable of type double?
[ ] a 2-tuple
[ ] an integer number
[x] a floating point number
[ ] a string with more than 255 characters

17. Other than shifting bits to the left, what is the << oprator used for ?
[ ] shifting characters to the left in a string.
[x] inserting characters into an output stream like std::cout.
[ ] comparing floating point numbers as less-than.
[ ] assigning a variable to a reference.

18. Which choice is a reason to specify the type of a pointer instead of using void *, which works as a pointer ro any type?
[ ] The compiler needs the dara type to make sure that the pointer is not going to be used on illegal non-pointable types such as functions, labels, pointers, and reference.
[ ] void * does not work for any type. The language does not allow assigning anything other than void to a pointer to void *.
[x] The compiler needs the data type to know how much memory to allocate for the pointer, because different data types require different pointer lengths.
[ ] Yes, it causes a compiler error because one field is defined as having a size of 0.

19. What is this expression equivalent to?
    A->B

[ ] *(A.B)
[ ] B=A
[x] (*A).B
[ ] &A.B

20. Which statement is true when declaring the member variable count as static?

                        class my_class{
                    public: static int count;
                        };

[ ] All objects that try to access their count member variable actually refer to the only class-bound static count variable.
[ ] The variable is allocated only once, regardless of how many objects are instantiated, because it is bound to the class itself, not its instances.
[ ] The variable existd when no objects of the class have been defined, so it can be modified at any point in the source code.
[x] The variable cannot be modified by any part of the code in the same application or thread. However, other threads may modify it.

21. When placed in a valid execution context, which statement will dynamically allocate memory from the heap for an integer of value 11?
[ ] int anInt = new int(11);
[ ] int* anInt = new int[11];
[ ] int anInt = new int[11];
[x] int* anInt = new int(11);

22. Which choice best describes the type long?
[x] an integer number of at least 32 bits
[ ] a string with more than 255 characters
[ ] a pointer
[ ] a 64-bit floating point number

23. Which of the following types has the closest functionality to a class?
[x] struct
[ ] union
[ ] enum
[ ] namespace

24. What will happen when you execute this code snippet?
                #include <iostream>

```cpp
int main() {
    float a = 5.51;
    int b = static_cast<int>(a);
    std::cout << b;
}
```
[ ] 6 will be printed on standard output, with no compilation warnings generated.
[x] 5 will be printed on standard output, with no compilation warnings generated.
[ ] 6 will be printed on standard output, with compilation warnings generated.
[ ] 5 will be printed on standard output, with compilation warnings generated.

25. Given these records in a map, how will you update the value for the key "Sinead" to 22?
[x] marks["Sinead"] = 22
[ ] marks["Sinead"].22
[ ] marks["Sinead"] -> 22
[ ] marks["Sinead"].value = 22

26. What is wrong with this piece of code?
```cpp
#include <iostream>
char str[20]'
int main(){
    std::cout << "What's your name? ";
    str << std::cin
    std::cout << "Hello, " << str;
    return 0;
}
```
[ ] The main function is supposed to have a void return type.
[ ] std::cin and std::cout are invalid. The correct names for the character input and output streams are cin and cout.
[ ] The address of str is supposed to be used. That is &str instead of str.
[x] The input operator flow is inverted. it should start from std::cin and then flow (>>) into str.

27. Does this code cause a compiler error? If so, why, and if not, what is child_t?
```cpp
typedef struct{
    unsigned int  age    : 4;
    unsigned char gender : 1;
    char                 : 0;
```

unsigned int size   : 2;
                }child_t;

[ ] Yes, it causes a compiler error because the colon character is not allowed in struct definitions.
[x] and child_t is a type defined as a structure with bit fields. It has 4 bits for age and 1 bit for gender in the first byte, and 2 bits for size in the second byte.
[ ] Yes, it causes a compiler error because there is an unnamed field.
[ ] Yes, it causes a compiler error because one field is defined as having a size of 0

28. What is the output of this piece of code?
int8_t a=200;
uint8_t b=100;
std::cout<<"a="<<(int)a;
std::cout<<", b="<<(int)b;
[x] a=-56, b=100
[ ] a=-55, b=100
[ ] a=200, b=-156
[ ] a=200, b=100

29. What is a valid definition for the get_length function, which returns the length of a null-terminated string?
[x] A
int get_length(char *str) {
    int count=0;
    while(str[count++]);
    return count-1;
}

[ ] B
int get_length(char *str) {
    int count=0;
    while(str!=NULL){
        count++;
        str++;
    }
    return count;
}

[ ] C

```c
int get_length(char *str) {
    int count=0;
    while((*str)++)
        count++;
    return count;
}
```

[ ] D
```c
int get_length(char *str) {
    int count=0;
    while(str++)
        count++;
    return count;
}
```

30. What does this code print?
```c
int i = 0;
printf("%d", i++);
printf("%d", i--);
printf("%d", ++i);
printf("%d", --i);
```
[x] 0,1,1,0
[ ] 0,1,0,1
[ ] 0,0,1,0
[ ] 1,0,1,0

Git

1. How can you check your current git version?
 [ ]git --v
 [x]git --version
 [ ]git --option
 [ ]git –current

2. What command lets you create a connection between a local and remote repository?
[ ] git remote add new
[x] git remote add origin
[ ] git remote new origin
[ ] git remote origin

3. Which of the following is true you when you use the following command?
git add -A

[x] All new and updated files are staged
[ ] Files are staged in alphabetical order.
[ ] All new files are staged
[ ] Only updated files are staged

4. What does the following command do to the git repository?

git reset --soft HEAD^

[ ] It deletes all previous commits and reset the repository history back to its initial state.

[ ] It resets the working branch to the first commit.

[ ] It keeps the HEAD at the current commit, but clears all previous commits.

[x] It sets HEAD to the previous commit and leaves changes from the undone commit in the stage/index.

5. Why would you use a pre-receive hook in your remote repository?

[ ] You wouldn't, you would use it in the local repository

[x] To execute a script when a remote receives a push that is triggered before any refs are updated

[ ] To fire a script after updates are made to the remote repository

[ ] To debug all commit tags and release versions

6. What option can you use to apply git configurations across your entire git environment?

[ ] --all

[ ] --master

[x] --global

[ ] –update

7. How could you squash multiple commits together without using git merge --squash?

[ ]Caching

[ ] You can't. git merge --squash is the only git command for that operation.

[x] Rebasing

[ ] Reflogging

8. How can you display a list of files added or modified in a specific commit?

[ ]Find the commit in the remote repository, as that's the only place that kind of information is stored.

[x]Use the diff-tree command with the commit hash.

[ ]Run git commit --info with the commit hash.

[ ]Access the commit stash data with git stash.

9. What files is this .gitignore programmed to leave out?

#.swift

build/

*.txt

*.metadata

[ ]All files with a .swift, .txt, or metadata file extension, as well as the entire build directory

[ ] Only the build directory

[x] All files in the build directory, as well as files ending with .txt or .metadata

[ ] Only files with .swift and .txt extensions.

10. After you make changes to a local repository, you run the following command. What will this do?

git commit -a -m "Refactor code base"

[ ] Nothing, you can't use multiple options in the same command

[ ] Adds all new files to the staging area

[ ]Commits all new files with a message

[x] Adds all modified files to the staging area, then commits them with a message

11. Where are files stored before they are committed to the local repository?

[ ] Saved files

[ ] git documents

[x] Staging area

[ ]git cache

12. What commands would you use to force an overwrite of your local files with the master branch?

[ ]A

 git pull --all

 git reset --hard origin/master

[ ]B

 git pull -u origin master

 git reset --hard master

[ ]C

 git pull origin master

 git reset --hard origin/myCurrentBranch

[X] D

 git fetch --all

 git reset --hard origin/master

13. What is the operation doing given the Git commands below?

git bisect start

git bisect bad 5d41402abc4b2a76b9719d911017c592

git bisect good 69faab6268350295550de7d587bc323d

[ ] It runs a merge of a good commit that is discovered using a known bad commit and known good commit

[ ] It marks a commit for deletion using a known bad commit and known good commit to determine which commit introduced a bug

[ ] It defines a bad commit and resets the HEAD using a known bad commit and known good commit

[X] It performs a binary search using a known bad commit and known good commit to determine which commit introduced a bug

14. Which of the following is true of the git push command?

[ ] By default a push doesn't send tags to the remote repository.

[ ] Commits can only be tagged when they are created.

[X] Tags are pushed to the remote repository with their respective commits.

[ ] Only annotated tags are automatically pushed to the remote repository with a commit.

15. What is the status of the beta-notes.js file in the following output?

Changes not staged for commit:

(use "git add <file>..." to update what will be committed)

(use "git checkout -- <file>..." to discard changes in working directory)

modified: beta-notes.js

[ ] beta-notes.js is untracked and has been modified.

[X] beta-notes.js is a tracked file and has been modified, but has not been added to the current commit.

[ ] beta-notes.js is untracked but has been added to the current commit.

[ ] beta-notes.js is tracked, and the modified file has been added to the current commit.

16. What is the best way to characterize the git commit structure?

[ ] Data array

[ ] Data log

[X] Data snapshot

[ ] Data dictionary

17. What change will the following command make to the staging area files?

git rm --cached testfile.js

[ ] testfile.js will be removed from the staging area and its changes no longer tracked.

[X] testfile.js will be removed from the staging area but its changes will still be tracked.

[ ] A copy of testfile.js will be cached on your desktop.

[ ] The current copy of testfile.js will be saved in the staging area.

18. Which setting determines what pager is used when Git pages output?

[ ]core.page

[ ]page

[ ]pager

[X]core.pager

19. Which option enables inclusion of committer name in custom log format?

[ ] %ce

[ ] %cr

[ ] %cd

[X]%cn

20. Which user should be created first during setting up of SSH?

[ ] git

[ ] admin

[ ] root

[x] None of these

21. Which of the following is an integration manager?

[ ] lieutenants

[ ] benevolent dictator

[x] Depends upon project type

[ ] Depends upon data

22. Which of the following is called dumb protocol?

[ ] All of these

[ ] SSH

[ ] Git

[x] HTTP

23. Which of these terms best describes Git?

[x] Distributed Version Control System

[ ] Issue Tracking System

[ ] Integrated Development Environment

[ ] Web-Based Repository Hosting Service

24. Which strategy is used by Git for merging two branches?

[ ] LIFO

[ ] recursive

[ ] FIFO

[x] octopus

25. What Language is used in GIT?

[x] C

[ ] C++

[ ] C#

[ ] Java

26. What is the main issue with using git rebase when working with multiple developers?

[x] Rebase affects only your repository and creates a diff in the master branch.

[ ] Rebase creates a temporary copy of the master branch in the remote repo.

[ ] Rebase moves the HEAD of the remote master branch one commit forward.

[ ] Rebase deletes all commit history for the new feature branch.

27. What is the difference between Git and SVN?

[ ] Git works only on Linux, while SVN works on all operating systems.

[ ] SVN works only on Linux, while Git works on all operating systems.

[x] SVN is a centralized system, while Git is a distributed system.

[ ] Git a centralized system, while SVN is a distributed system.

28. While pushing changes to a remote repository, you receive the following message. How do you resolve this issue?

error: failed to push some refs to 'https://github.com/myrepo/simple.git'

hint: Updates were rejected because the remote contains work that you do not hint: not have locally.

[ ] Use the --atomic option with the push command.

[x] Execute a pull, then resolve any merge conflicts and execute another push.

[ ] Execute a fetch, then execute another push.

[ ] Use the --force option with the push command.

29. What type of Git hook could be used to validate that a commit message contains a ticket number?

[ ] pre-commit

[x] commit-msg

[ ] applypatch-msg

[ ] prepare-commit-msg

30. After making some major changes to your code, you are a little nervous about committing. What command would you use to review the commit prior to making it?

[ ] git commit --verify

[ ] git notes show

[ ] git commit preview

[x] git commit --dry-run