



VICTORIA UNIVERSITY OF
WELLINGTON
TE HERENGA WAKA

TERM TEST II – 2022
TRIMESTER 1

NWEN 241
SYSTEMS PROGRAMMING

Time Allowed: 45 MINUTES

CLOSED BOOK

Permitted materials: Only silent non-programmable calculators or silent programmable calculators with their memories cleared are permitted in this test. No electronic dictionaries are allowed. Paper foreign to English language dictionaries are allowed.

Instructions: Attempt ALL **TWENTY EIGHT(28)** questions.

There are two sections:

- SECTION A - Multiple Choice [20 marks]
- SECTION B - Short ANSWERS [25 marks]

The test consists of 45 marks in total.

You must write your answers in the boxes provided within the questionnaire.

SECTION A Multiple Choice (20 marks)

Instructions: There are 20 questions in this section. Each question is worth 1 mark. Write the letter of the correct answer in the box provided.

1. In the `listen` system call of the Linux Operating System, what does the parameter `backlog` define? **(1 mark)**

- (a) Maximum number of pending connections allowed
- (b) Maximum number of the concurrent connections allowed
- (c) Minimum number of pending connections allowed
- (d) Minimum number of the concurrent connections allowed

2. Which one of the following system calls used in Linux socket programming is a blocking system call? **(1 mark)**

- (a) Listen
- (b) Accept
- (c) Socket
- (d) Bind

3. In which one of the following Linux system calls, an identical copy of the original process is created? **(1 mark)**

- (a) `execl`
- (b) `execv`
- (c) `fork`
- (d) `wait`

4. Which one of the following is not an access specifier in C++? **(1 mark)**

- (a) `public`
- (b) `private`

- (c) protected
- (d) internal

5. Select the primitive data type which is supported by C++ but not by C. **(1 mark)**

- (a) int
- (b) char
- (c) bool
- (d) float

6. Given a class `MyClass`, select the correct syntax to create an object `myObj` of `MyClass` in C++. **(1 mark)**

- (a) `class MyClass = new myObj;`
- (b) `class myObj = new MyClass();`
- (c) `MyClass myObj;`
- (d) `MyClass myObj = new MyClass;`

7. Which one of the following operators is used to define a reference variable in C++? **(1 mark)**

- (a) *
- (b) &
- (c) ->
- (d) ::

8. Consider the following code snippet. Which one of the following best describes the constructor defined for `class A` at **line 6**? **(1 mark)**

```
1. #include<iostream>
2. class A{
3.     int a;
4.     int b;
5.     public:
6.     A(int x, int y = 10):a(x),b(y){}
7. };
8.
9. int main(){
10.     A a1(5);
11. }
```

- (a) Default constructor
- (b) Paramterized constructor
- (c) Paramterized constructor with default values
- (d) None of the above

9. State True or False. An abstract class is a class that has at most one pure virtual function member. **(1 mark)**

- (a) True
- (b) False

10. Which one of the following statements is true about destructors in C++? **(1 mark)**

- (a) It has no arguments and no return values
- (b) It has no arguments but has return values
- (c) It has both arguments and return values
- (d) It has arguments but no return values

11. State True or False. Declaring a constructor as `explicit` prevents implicit casting of constructor arguments to class objects. **(1 mark)**

- (a) True

(b) False

12. What does the capacity of a `vector` refers to in C++? **(1 mark)**

- (a) The number of elements currently stored in the vector
- (b) The maximum number of elements that can be stored in the vector without the need for reallocation
- (c) The maximum size to which the vector can grow due to implementation limitations
- (d) The unused memory space of the vector

13. State True or False. The default open mode for a file opened with `ifstream` object is `ios::in`. **(1 mark)**

- (a) True
- (b) False

14. State True or False. Given a set `S` and a key `K`, the value of `S.count(K)` will either be 0 or 1. **(1 mark)**

- (a) True
- (b) False

15. Which one of the following statements best describes the use of destructors in C++? **(1 mark)**

- (a) A destructor is called when a program that declares an object of a class ends
- (b) A destructor is called when a function that declares an object of a class ends
- (c) A destructor is called when `delete` is used to delete a dynamically allocated object
- (d) All the above

16. State True or False. In C++, the statement `delete p;` deallocates the memory pointed-to by variable `p` and not the variable `p`. **(1 mark)**

- (a) True
- (b) False

17. Which of the following is a correct statement to read a maximum of 20 characters into a C-string `s` until the extracted character is `'t'`? **(1 mark)**

- (i) `std::cin.getline(s, 20, 't');`
- (ii) `std::cin.getline(s, 21, 't');`
- (iii) `std::cin.get(s, 20, 't');`
- (iv) `std::cin.get(s, 21, 't');`

- (a) (i) Only
- (b) (iii) Only
- (c) (ii) and (iv) Only
- (d) (i) and (iii) Only

18. In C++, which one of the following will read an entire line from keyboard and store it in a `std::string` variable `str`? **(1 mark)**

- (a) `std::cin >> str;`
- (b) `std::cin << str;`
- (c) `std::getline(std::cin, str);`
- (d) `std::gets(std::cin, str);`

19. Which one of the following function declarations is valid in C++? **(1 mark)**

- (a) `int fun(int x = 0, int y = 0, int z);`

- (b) `int fun(int x, int y = 0, int z=0);`
- (c) `int fun(int x=0, int y, int z=0);`
- (d) `int fun(int x=0, int y, int z);`

20. What will be the output of the following C++ program if the user enters **NWEN241 !!?**
(1 mark)

```
#include<iostream>
using namespace std;
int main ()
{
    char c[20];
    char c1;
    cin.get(c,20,' ');
    cin.get(c1);
    cout<<c<<" "<<c1;
}
```

- (a) NWEN241
- (b) NWEN241 !!
- (c) Garbage
- (d) NWEN241 !

SECTION B Short Answer Questions (25 marks)

Instructions: There are 8 questions in this section. Marks for questions in this section are included with the question.

21. Consider the following code segment. Write a single C++ statement to access the variable `a` of namespace `Box1`. (2 marks)

```
1. namespace Box1
2. {
3.     int a = 4;
4. }
5.
6. namespace Box2
```

```
7.  {
8.   int a = 13;
9.  }
```

22. How many times will the following C program print Hello? **(2 marks)**

```
#include<stdio.h>
#include <unistd.h>
int main() {
    fork() && fork();
    fork();
    printf("Hello\n");
}
```

23. List 4 stream objects predefined in C++? **(2 marks)**

24. In C++, what is defined in the Standard Template Library (STL). **(3 marks)**

25. Give a C++ statement which uses the delete operator to deallocate memory allocated by the following statement?

```
employee *elist = new employee[10];
```

(2 marks)

26. Write a single C++ statement that will declare an ifstream object and open a binary file pic.gif for input. **(2 marks)**

27. What is the output of the following C++ program? **(2 marks)**

```
#include <iostream>
using namespace std;

class base {
public:
    base() { cout<<"BCon"<<endl;
    }
};

class derived: public base{
public:
    derived(){ cout<<"DCon"<<endl;
    }
};

int main(){
    derived objD;
    return 0;
}
```

28. Answer the following questions related to the code snippet below.

```
1. #include <iostream>
2. using namespace std;
3.
4.     class A {
5.         public:
6.             int a;
7.             A():a(0),aa(0),aaa(0){}
8.             void f1(void) {a = 10;}
9.             void f2(void) {aa = 20;}
10.            void f3(void) {aaa = 30;}
11.            void disp() {
12.                cout<<"aaa ="<<aaa<<endl;
```

```

13.         }
14.     protected:
15.         int aa;
16.         void f3(void) const;
17.     private:
18.         int aaa;
19. };
20. class B: public A {
21.     int b;
22.     public:
23.         B():A(){b = 0; }
24.         void disp() {
25.             // display the value of data member aaa by invoking
26.             // the function disp() of class A
27.             cout<<"b ="<<b<<endl;
28.         }
29. };
30.
31. int main(){
32.     A objA;
33.     B b1;
34.     b1.disp();
35. }

```

(a) State True or False. The statement `objA.aa = 10;` is valid. **(2 marks)**

(b) Write the C++ statement to replace the comment at line number 25. **(2 marks)**

(c) State True or False. The function `disp()` of class A is an overloaded function. **(2 marks)**

(d) Write the C++ statement to invoke `disp()` function of class A using the instance `b1` of class B. **(2 marks)**

(e) State True or False. Calling the member functions f1() and f2() from within member function f3() is valid. **(2 marks)**

SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.