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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

a

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`

b

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`

c

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

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

(c) `protected`

(d) `internal`

d

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`

c

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;`

c

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

(a) `*`

(b) `&`

(c) `->`

(d) `::`

b

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

c

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

b

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

a

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

a

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

b

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

(a) True

(b) False

a

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

a

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

d

16. State True of 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

a

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) `(ii)` Only

    (b) `(iii)` Only

    (c) `(ii)` and `(iv)` Only

    (d) `(i)` and `(iii)` Only

c

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);`

c

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);`

b

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

```
#include<iostream>
using namesapce 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 !

a

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.   }
```

Box1::a

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");
}
```

6

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

cin, cout, cerr, clog

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

Containers, Algorithms, Iterators

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)

delete[] elist;

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

ifstream ifs("pic.gif", ios::binary);

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;
 }
```

BCon
Dcon

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)**

False

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

A::disp();

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

False

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

b1.A::disp();

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

False

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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.