



COS1512 Now 2022 Exam - Exam

Introduction to programming II (University of South Africa)



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MENU

**Started on** Friday, 11 November 2022, 9:57 AM**State** Finished**Completed on** Friday, 11 November 2022, 11:57 AM**Time taken** 2 hoursQuestion **1**

Complete

Marked out of 1.00

Given the code

```
vector<int> numbers(20);
```

what is the result of executing the following statement?

```
numbers.resize(10);
```

Select one:

- ☐ This causes a run-time error
- ☒ The last 10 elements are removed
- ☐ No change
- ☐ The first 10 elements are removed





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MENU

Consider the following partial class declaration of an ADT:

```
class Player

{

    friend istream & operator >> (istream & ins, Player & P);

    public:

        Player();

        Player(string nam, int point);

        int getPoints() const;

        void setName(string n);

        void increment(int nrPoints);

    private:

        string name;

        int points;

};
```

Complete the code below by choosing the correct options in the drop-down lists.

```
Player aPlayer(" ", 0); //Instantiate an object aPlayer of the class Player using the default constructor
```

```
cin >> aPlayer; //Use the overloaded stream extraction operator to read a value for
the object aPlayer from the keyboard
```

```
if (aPlayer.getPoints() < 100) //Test if aPlayer's points is less than 100,
```

```
    aPlayer.points = aPlayer.points + 20; //If the points is less than 100, increment it by 20.
```





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MENU

Given the two function declarations for function `func`, that does the same except that one version expects two integer parameters, and the other expects a `float` and an integer parameter

```
void func(int a, int b)
{
}

void func(int a, float b)
{
}
```

Which parameters would you change to a `T` in order to make this a template function?

Select one:

- ☒ Neither parameters change.
- ☐ Both parameters change.
- ☐ The parameter that is an integer in one function and a `float` in the other function.
- ☐ The parameter that always stays an integer.

Question 4

Complete

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In the derived class definition, you list from the base class

Select one:

- ☐ only those member functions that need to be redefined.
- ☐ all the member functions every time.
- ☒ only those member functions you want to overload.
- ☐ only those member functions that were in the public section.





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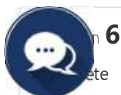
A C++ class template can support different data types for the same logic.

Select one:

☒ True

☐ False





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Consider the partially-coded program to process a text file "Characters.txt" character by character.

Complete the code below by choosing the correct options in the drop-down lists.

```
#include <  > // directive for using a file

//other directives

using namespace std;

int main()

{

     //declare input stream for file input

     //open and connect input stream to a file "Characters.dat"

    if (  //check if input file exists

    {

        //exit program if input file does not exist

    }

    char ch;

     //read character from input file

    while (  ) //to read all characters from input file

    {

        //process character

        //read character from input file

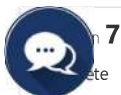
    }

     //close input file

    return 0;

}
```





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Complete

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Given the following template function definition, which of the following is **NOT** a valid invocation of the function:

```
template <class T>
void swap(T& left, T& right)
{
    //implementation goes here, not relevant to the question
}

int int1, int2;

float flt1, flt2;

char ch1, ch2;

string s1, s2;
```

Select one:

- ☒ swap(int1, ch2);
- ☐ swap(ch1, ch2);
- ☐ swap(int1, int2);
- ☐ swap(s1,s2);

Question 8

Complete

Marked out of 1.00

The _____ macro prints a message and terminates program execution if the value of the expression the macro evaluates is 0.

Select one:

- ☐ fail
- ☒ cassert
- ☐ ndebug
- ☐ assert





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A character array terminated with the null character is most correctly called

Select one:

- ☒ a C-string
- ☐ a string
- ☐ a character array
- ☐ None of the other options

Question 10

Complete

Marked out of 1.00

What is the output of the following code fragment?

```
int v1=2, v2=-1, *p1, *p2;

p1 = & v1;

p2 = & v2;

p2 = p1;

cout << *p2 << endl;
```

Select one:

- ☐ 1
- ☐ -2
- ☒ 2
- ☐ -1





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when working with pointers, the `&` operator can be used

Select one or more:

- ☒ to declare a pointer variable
- ☐ to dereference the value to which a pointer variable points
- ☒ to define a pointer type





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For this question you have to type code in the textbox provided. You cannot attach a file as answer. NB. do not use TAB when entering your code, rather use spaces to indent.

Consider the following (partial) class declaration of an ADT provided in a file `Player.h`:

```
class Player
{
    friend bool operator > (const Player &player1, const Player &player2); // returns true if player1
    has more points than player2, false otherwise

    friend ostream & operator<<(ostream & out, const Player & P); //displays player's name and points

public:
    Player();
    ~Player();

    string getName() const;
    void setPoints(int p);

private:
    string name;
    int points;
};
```

Using **separate compilation**, provide the implementation file for the class `Player`. Include all the necessary header files, and implement **only** the member functions in the given class declaration. There is no need for comments.

```
#include <iostream>
#include "Address.h"

using namespace std;

Player::Player()
{
    name = " ";
    points = 0;
}

Player::~~Player()
{
}

string Player::getName() const
```





Return name;

MENU

```
void Player::setPoints(int p)
```

```
{  
    this->points = p;  
}
```

```
bool Player::operator > (const Player &player1, const Player &player2)
```

```
{  
  
}
```

```
ostream & Player::operator<<(ostream & out, const Player & P)
```

```
{  
  
}
```

Question **13**

Complete

Marked out of 1.00

The destructor for a class is called

- ☐ when the class is instantiated
- ☒ only at the end of the main function
- ☐ when the object of the class goes out of scope
- ☐ explicitly from the main program





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If we use an out of range index with a vector, there will be an error message from the compiler.

Select one:

- ☐ True
- ☒ False

Question 15

Complete

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In which case would you consider using a dynamic array?

Select one:

- ☒ If the program needs to get the size of the array from the user because it may differ each time the code is executed
- ☐ You should always use a dynamic array.
- ☐ If the array size is big, but known at compile time.
- ☐ If the array is small, and the size is known before the program runs.

Question 16

Complete

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To declare a vector `shopsInMall` with objects of a class `Shop`, we use the following statement

Select one:

- ☐ `vector<Shops> shopsInMall;`
- ☒ `vector<Shop> shopsInMall;`
- ☐ `vector<shop> shopsInMall;`
- ☐ `vector<shopsInMall> Shop;`





Question 17

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We can assign a null value to a pointer `ptr` with the following statement.

Select one or more:

- ☒ `int *ptr = 0;`
- ☐ `int* ptr{};`
- ☒ `int *ptr = NULL;`

Question 18

Complete

Marked out of 1.00

We can initialize a vector `v` in the following way

Select one or more:

- ☒ `vector<int> v(10);`
- ☒ `vector<char> v = {'a', 'b', 'c', 'd', 'e'};`
- ☐ `v.push_back("hi");`
`v.push_back("there");`
`v.push_back("hello");`
`v.push_back("world");`





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Consider the template function

```
template <class T>
T secret(T x, T y)
{
    return x + y;
}
```

If `secret` is called in the following statement

```
string s1 = "sunny";
string s2 = "day";
cout << secret (s1, s2);
```

the compiler will expand it to

Select one:

- ☒ `string secret (string x, string y)`
- ```
{
 return x + y;
}
```
- ☐ `int secret (int x, int y)`
- ```
{
    return x + y;
}
```
- ☐ `T secret (T x, T y)`
- ```
{
 return x + y;
}
```
- ☐ The compiler will give an error message.





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MENU



Given the declarations

```
class Pet //implemented as an ADT
```

```
{
public:
 string getColour();
 string getType();
//other member functions
private:
 string name;
 string colour;
 int age;
```

```
};
int nrPets = 30;
Pet myPets[nrPets];
```

To display the names of all the **brown** pets in the array `myPets` on the screen, we use the statement

```
for (int i = 0; i < nrPets; i++)
 if (myPets[i].colour == "brown")
 cout << myPets[i].name << endl;
```

Select one:

- ☐ True
- ☒ False





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The base case in a recursive function

Select one:

- ☐ generates the recursive calls
- ☒ ensures that the recursion will stop eventually
- ☐ allows the function to call itself repeatedly
- ☐ can be omitted safely

Question 22

Complete

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In order to make a user-defined ADT that is defined in the file `myfile.h` available to the application file, you would use

- ☐ `#include myfile.h`
- ☐ `#include myfile`
- ☒ `#include "myfile.h"`
- ☐ `#include <myfile.h>`







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MENU

which of the following functions could be included in a program with the function

```
void myFunc(double a, int b);
```

without causing any errors?

Select one:

- ☒ `void myFunc(double b, int a);`
- ☐ `void myFunc(double a);`
- ☐ `void myFunc(double a = 2.2, int b = 3);`





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Consider the class `Student`.

```
class Student
{
public:
 Student(string sNr, string sName, string sDegree);
 string getStdNr() const;
 string getName() const;
 string getDegree() const;
 friend ostream& operator<< (ostream& outs, const Student& s);

private:
 string studentNr;
 string name;
 string degree;
};
```

- (a) Derive a class `Postgrad` from the class `Student`. Provide only the interface for the class `Postgrad`. The class `Postgrad` has an additional private string member variable `supervisor`. Redefine the overloaded operator `<<` for the class `Postgrad`. (6)
- (b) Implement only the overloaded constructor for the class `Postgrad`. (3)



MENU Question **25**

Complete

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Consider the accompanying definition of a recursive function. Which of the statements represent the general case?

```
void printNum(int num) //Line 1
{ //Line 2
 if (n < 0) //Line 3
 cout << "Num is negative" << endl; //Line 4
 else if (num == 0) //Line 5
 cout << "Num is zero" << endl; //Line 6
 else //Line 7
 { //Line 8
 cout << num << " "; //Line 9
 printNum(num - 1); //Line 10
 } //Line 11
} //Line 12
```

Select one:

- ☐ Statements in Lines 3-11
- ☐ Statements in Lines 5-6

[◀ Additional Resources](#)



Question 26

Complete

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MENU

Given the declarations

`char s1[ ];``char s2[ ];``char s3[ ];`We can concatenate `s1` and `s2` into `s3` with the statement`s3 = s2 + s2;`

Select one:

☒ True☐ False

Question 27

Complete

Marked out of 1.00

Which of the following statements regarding dynamic variables is true?

- ☐ A dynamic variable is accessed via a pointer variable.
- ☒ A dynamic variable is created using the `new` operator.
- ☒ A dynamic variable is a variable that is created and destroyed during the execution of the program.





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Given the declarations

```
char s1[9];
char s2[9];
```

the correct statement to display "Well done!" when the first 5 characters in s1 and s2, are the same, is

Select one:

- ☐ if (!(strcmp(s1,s2,5)))  
    cout << "Well done!";
- ☐ if (!(strncmp(s1,s2,5)))  
    cout << "Well done!";
- ☒ if (strncmp(s1,s2,5))  
    cout << "Well done!";
- ☐ if (strcmp(s1,s2,5))  
    cout << "Well done!";

