

OHI-1106 Programming I

Class Exam

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Imed Hammouda

Make sure you read the questions carefully before giving your answer. Put your name and student number on each answer sheet.

This exam consists of 2 pages. The maximum amount of points is 70 (30 points for part A and 40 points for part B).

Written material, mobile phones and calculators are NOT allowed in the exam.

Good luck!

Part A

True or False?

Use 'T' for True and 'F' for False. Give the right answer, in the form of:

1. T
2. F
3. T
- ...

1. When working with loops, the 'break' jump statement will force the next iteration.
2. In C++ two different functions can have the same name if their parameter types are same.
3. In C++, the expression $5/2$ is evaluated to 2.5.
4. If you have written your own header file named mytypes.h, then the preprocessor directive
`#include <mytypes.h>`
is the correct way to insert the contents of the header file into a program.
5. In imperative languages, changing the order of statements always changes the meaning of the program.
6. Every component in an array must have the same type, and the number of components is fixed at compile time.
7. A structured data type is a data type that cannot be decomposed into further component parts.
8. Given the declarations
`const int num_weeks = 5;`
`const int num_teams = 6;`
`int tickets[num_teams][num_weeks];`
The number of rows and columns in tickets is 5 and 6 respectively.
9. $0 \% 7.0$ yields the value 0.
10. If floatValue is a float containing 5.0, the expression
`float(int(floatValue * 10.0 + 2.0)) / 10.0;`
gives 5.2 as its result.
11. The program becomes more readable if type casting is used instead of type coercion.
12. Promotion and demotion may cause loss of information.
13. Functions can have no return value but should always be passed a number of parameters.

14. Functions cannot call previously undeclared functions.
15. A function is allowed to have only one return statement.
16. The actual parameters are evaluated before being passed to the function.
17. Changes made to a parameter that is passed by reference to a function will revert back to the original value when the function exits.
18. Any for loop can be translated into a logically equivalent while loop.
19. Since arrays make it possible to access multiple values using the same variable, it is permissible to store elements with different data types in the same array.
20. A union is a struct that holds at least one of its members at a time during program execution.

Part B

The Finnish Ice Hockey league is currently playing. There are exactly 14 teams. Each team can have a variable number of players. The following information is stored for each player: name, number, position and number of goals. The position can be goaltender, defence or forward.

- a. Describe the data structures and types you would use to store teams and the players in a team. Give the corresponding C++ declarations.
- b. Implement a function that prints all information of all the league players.
- c. Implement a function that returns the index of the team with a specific player name. Assume that all player names are distinct. If the target name is not found, -1 is returned.
- d. How would you find the nth team (i.e. first, second, etc) based on the largest number of goals scored by all the team players. Write down your algorithm! Give the supporting C++ code assuming that the function `sort` of the C++ library algorithm is used.