

**OHJ-1106 Programming I**  
Class Exam  
Tuesday 09 April 2013

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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. **F**
2. In C++ two different functions can have the same name if their parameter types are same. **F**
3. In C++, the expression  $5/2$  is evaluated to 2.5. **F**
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. **F**
5. In imperative languages, changing the order of statements always changes the meaning of the program. **F? not always**
6. Every component in an array must have the same type, and the number of components is fixed at compile time. **T**
7. A structured data type is a data type that cannot be decomposed into further component parts. **F**
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. **F**
9.  $0 \% 7.0$  yields the value 0. **F**
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. **T**
11. The program becomes more readable if type casting is used instead of type coercion. **T**
12. Promotion and demotion may cause loss of information. **T**
13. Functions can have no return value but should always be passed a number of parameters. **F**

14. Functions cannot call previously undeclared functions. T
15. A function is allowed to have only one return statement. F
16. The actual parameters are evaluated before being passed to the function. T
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. F
18. Any for loop can be translated into a logically equivalent while loop. T
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. F
20. A union is a struct that holds at least one of its members at a time during program execution. F

## Part B

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

- Describe the data structures and types you would use to store teams and the players in a team. Give the corresponding C++ declarations.
- Implement a function that prints all information of all the league teams.
- Implement a function that returns the index of the team with a specific captain name. Assume that all captain names are distinct. If the target name is not found, -1 is returned.
- How would you find the  $n$ th 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.