

CSCI 135 Software Design and Analysis, C++
Homework 5
Due 3/21/2014

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Problem 1: Uncertain Bool

Consider the following incomplete class declaration:

```
class UncertainBool {  
    char b;  
public:  
    .  
    .  
    .  
};
```

The idea is to extend the bool type to express values like true, false, and uncertain. All the following functions are to be implemented as part of the class.

- (a) Implement a constructor that takes one character as a parameter, 'T', 'F', or '?' and initializes the uncertain bool, by setting its private data member *b* accordingly. If the parameter is none of these characters, it is interpreted as '?'. We will assume that the value of the uncertain bool is true if b='T', false if b='F', and uncertain if b='?'.
- (b) Implement a constructor that takes one bool as parameter and initializes the uncertain bool accordingly.
- (c) Implement a default constructor that initialized the uncertain bool to uncertain.
- (d) Implement three functions isTrue, isFalse, and isUncertain that return true if the value of the uncertain bool is true, false, and uncertain, respectively; otherwise, return false.
- (e) Implement a function called print that outputs the value of the uncertain bool as "true", "false", or "uncertain".

Problem 2: A logic that “socks”

(a) Write a function called `uand` to compute the logical and of two uncertain bools. The function must return an uncertain bool.

(b) Write a function called `uor` to compute the logical or of two uncertain bools. The function must return an uncertain bool.

(c) Write a function called `unot` to compute the logical negation on an uncertain bool. The function must return an uncertain bool.

(d) Write a function called `uequal` to test whether two uncertain bools are equal. The function must return an uncertain bool.

(e) In main, have the user enter a response to the following questions:

- are your socks cotton?
- are your socks red?

The user can enter a positive number meaning yes, a zero meaning no, or a negative number meaning he does not know.

Use two uncertain bools to record the answers of the user. Then output the result of the following assertions:

- the socks are cotton but not red
- the socks are not cotton or they are red
- the socks are cotton and red, or not cotton and not red

Problem 3: Jumping game revisited

Refer to the previous homework. This time, an array of length n contains integers less than n , but some may be negative. A negative entry means its missing. Therefore, if the jumping game reaches a missing entry, the result of the game is not known. Repeat the previous homework, but the function terminate should now return an uncertain bool.