



Interview Piscine

Rush01 Interview Question

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Summary: This document describes a rush question for the Interview Piscine

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Chapter I

Interview Rules

I.1 General Rules

- The interviewer and interviewee are equally responsible for scheduling the interview.
- The interviewer must read and understand the question and its solutions before the interview begins.
- The interview should last **45 minutes**.
- Both the interviewer and the interviewee must be present.
- The interviewee should write their code on a whiteboard in the language of their choice.
- The interviewee may not use any reference materials or programs to help them write their solution.
- Do not share this document or discuss this problem with other students outside of the context of an interview.

I.2 During the Interview

During the interview, we ask you to:

- Make sure the interviewed student understands the question.
- Give her/him any clarification on the subject that she/he might need.
- Let her/him come up with a solution before you guide her/him to the best solution given the constraints (time and space).
- Ask the student what is the complexity of her/his algorithm? Can it be improved, and how?
- Guide her/him to the best solution without giving the answer. You may refer to the hints for that.
- You want to evaluate how the interviewed student thinks, so ask her/him to explain everything that she/he thinks or writes (there should be no silences).

- If you see a mistake in the code, wait until the end and give her/him a chance to correct it by her/himself.
- Ask the student to show how the algorithm works on an example.
- Ask the student to explain how edgecases are handled.
- Bring out to the student any mistake she/he might have done.
- Give feedback on her/his performances after the interview.
- Be fair in your evaluation.

As always, stay mannerly, polite, respectful and constructive during the interview. If the interview is carried out smoothly, you will both benefit from it!

Chapter II

DrunkenStumble

II.1 Interview Question

You are drunk, trying to get home from the bar. For every step you take you find yourself at an arbitrary house one position to the left or right of your current location. What is the probability you will make it home d houses away within n steps?

II.2 Solutions

II.2.1 Naive solution

If the current distance to home is zero, the probability is 1.0. If the current distance to home is greater than the remaining number of steps, the probability is 0. Otherwise, recur to find the probabilities at the locations one step closer and one step farther (and therefore with one fewer steps remaining in either case), and return the average of these.

Time complexity: $O(2^n)$

Space complexity: $O(2^n)$

```
float drunken_stumble(int d, int steps)
{
    if (d == 0)
        return (1.0);
    if (d > steps)
        return (0.0);
    return ((drunken_stumble(d + 1, steps - 1) + drunken_stumble(d - 1, steps - 1)) / 2);
}
```

II.2.2 Optimized Solution - Memoization

Time complexity: $O(n)$

Space complexity: $O(n)$

```
float drunken_stumble(int d, int steps, float* memo)
{
    if (d == 0)
        return 1.0;
    if (d > steps)
        return 0.0;
    if (!cached[d])
        cached[d] = (drunken_stumble(d + 1, steps - 1, cached) + drunken_stumble(d - 1, steps - 1,
            cached)) / 2;
    return (cached[d]);
}
```