

1.1 (due Feb. 5, 2009) Write a C program which estimates unknown parameter p of a Bernoulli distribution. The program should first read the value of $\varepsilon \in (0, 1)$ from the standard input (stdin). Then it should read values 0, 1 from the standard input, these are independent samples from Bernoulli(p). After it read enough samples it should output \hat{p} (your program should decide what is “enough”).

Your grade will be determined using dollars and tokens:

- you pay \$1 for each sample read,
- if \hat{p} satisfies $p - \varepsilon \leq \hat{p} \leq p + \varepsilon$ you get one token.

The program will be executed 100,000 times (with different values of p and ε). If you collect less than 95,000 tokens you get zero points for this exercise. If you collect at least 95,000 tokens then the number of points awarded will depend on the amount of dollars you spent (less dollars spent \implies higher grade).

1.2 (due Feb. 5, 2009) Write a C program which decides which Bernoulli distribution has the larger value of the unknown parameter p . The program should read pairs of values 0, 1 from the standard input, the first component is independent sample from Bernoulli(p_1), the second component is independent sample from Bernoulli(p_2). After it read enough samples it should output $j \in \{1, 2\}$, the index of the larger of the parameters (your program should decide what is “enough”).

Your grade will be determined using dollars and tokens:

- you pay \$1 for each sample read,
- if j satisfies $p_j > p_{3-j}$ you get one token.

The program will be executed 100,000 times (with different values of p_1, p_2 , with $p_1 \neq p_2$). If you collect less than 95,000 tokens you get zero points for this exercise. If you collect at least 95,000 tokens then the number of points awarded will depend on the amount of dollars you spent (less dollars spent \implies higher grade).
