Analysis of Algorithms

The **hard deadline** for this quiz is **Sat 14 Nov 2015 8:59 PM PST -0800**.

To specify an array or sequence of values in an answer, you must separate the values by a single space character (with no punctuation and with no leading or trailing whitespace). For example, if the question asks for the first ten powers of two (starting at 1), the only accepted answer is:

1 2 4 8 16 32 64 128 256 512

If you wish to discuss a particular question and answer in the forums, please post the entire question and answer, including the seed (which is used by the course staff to uniquely identify the question) and the explanation (which contains the correct answer).
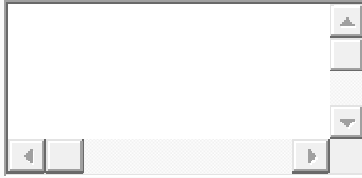
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Question 1

(seed = 695164)
Suppose that you time a program as a function of N and produce
the following table.

```
     N    seconds
-------------------
     36      0.00
    216      0.08
   1296     29.96
   7776  10315.11
```

Estimate the order of growth of the running time as a function of N.
Assume that the running time obeys a power law $T(N) \sim a N^b$. For your
answer, enter the constant b. Your answer will be marked as correct
if it is within 1% of the target answer - we recommend using
two digits after the decimal separator, e.g., 2.34.

Answer for Question 1

Question 2

What is the order of growth of the worst case running time of the following code fragment
as a function of N?

```
int sum = 0;
for (int i = N; i > 0; i--)
    for (int j = 0; j < i; j++)
        sum++;
```

○ 1

○ log N

○ N^1/2

○ N

○ N log N

○ N^2 log N

○ N^3/2

○ N^2

○ N^5/2

○ N^3

○ N^4

○ N^5

○ N^6

○ N^7

Question 3
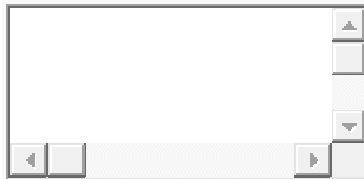
Given the following definition of a MysteryBox object:

```
public class MysteryBox {
    private double x0, x1, x2, x3;
    private boolean y0;
    private long z0;
    private int[] a = new int[320];

    ...
}
```

Using the 64-bit memory cost model from lecture, how many bytes does each object of t
ype MysteryBox use?

Answer for Question 3