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0. How many cycles per second in a GHz (giga Hertz)?

1,000,000,000

7/10

1. Which power of 2 is closest to a million? What is the nearest integer to log 1000000?

2^{17}

Integer = 17

2. What is the minimum time to the nearest second that a computer with 16 GB RAM and a quad (4) core 2 GHz processor can locate all bytes in its RAM which are set to 'V'?

2 seconds.

3. Give at least two reasons why it is a harder task for Google to find the best ten web pages with Victor Milenkovic on them (compared to #2).

- Speed of light limitation prevents calling billions of web pages within Google's hardware.
- Google also accounts for page rank — returning the most useful pages.

4. If a single weighing can determine that a pile of coins contains one real coin, how many weighings does it take to locate the one real coin in a pile of 1000?

11 weighs.

$w = \log_2 1000$

5. Same question, pile of n?

$\log_2 n$ = Weighs

```
public class Computer {
    private int ramSize;        // gibibytes
    private double speed;       // gigaHertz

    public Computer (int ram, double speed) {
        ramSize = ram;
        this.speed = speed;
    }
    public int getRamSize () { return ramSize; }
    public int getSpeed () { return speed; }
    public double getPower () { return ramSize * speed; }
}

public class Laptop extends Computer {
    private double weight;

    public Laptop (int ram, double speed, double weight) {
        super(ram, speed);
        this.weight = weight;
    }
    public double getWeight () { return weight; }
    public double getPower() { return ramSize * speed / 2; }
}
```

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6. Why doesn't Laptop.getPower compile and what are two ways to fix it?

- ramSize is a private variable; you could instead make it a protected variable for computer and its extention, laptop.
- You could also create a get method within laptop that returns ramSize

After you fix Laptop.getPower, what will the following code (#7-#9) do?
Answer compiler error, runtime exception, or what it prints out.

7.
```
Computer c = new Laptop(8, 2.5, 7.5);
System.out.println(c.getWeight());
```

Compiler error

8.
```
Computer c = new Laptop(8, 2.5, 7.5);
System.out.println(c.getPower());
```

Runtime exception.

9.
```
Computer c = new Computer(16, 3.0);
Laptop l = (Laptop) c;
System.out.println(l.getPower());
```

48.0