Question: You have been given 2 special, extremely rugged Xboxes. You are in an office building that is 120 stories high. Using the fewest possible number of drops from windows in your office building, determine the highest floor you can drop an Xbox from and have it survive: for example, they might be able to take the drop from the 30th floor, but not the 31st. You can break both Xboxes in your search. State the worst case number of drops needed and explain how you arrived at that answer.

Answer: 15

“Let us make our first attempt on x'th floor.

If it breaks, we try remaining (x-1) floors one by one.

So in worst case, we make x trials.

If it doesn’t break, we jump (x-1) floors (Because we have

already made one attempt and we don't want to go beyond

x attempts. Therefore (x-1) attempts are available),

Next floor we try is floor x + (x-1)

Similarly, if this drop does not break, next need to jump

up to floor x + (x-1) + (x-2), then x + (x-1) + (x-2) + (x-3)

and so on.

Since the last floor to be tried is 100'th floor, sum of

series should be 100 for optimal value of x.

x + (x-1) + (x-2) + (x-3) + .... + 1 = 120

x(x+1)/2 = 120

x = 15

Therefore, we start trying from 15'th floor. If Egg breaks

we one by one try remaining 14 floors. If egg doesn't break

we go to 29th floor.

If egg breaks on 27'th floor, we try floors form 15 to 26.

If egg doesn't break on 27'th floor, we go to 39'th floor.

An so on...”

|  |  |
| --- | --- |
| **Drop** | **Floor** |
| #1 | 15 |
| #2 | 29 |
| #3 | 42 |
| #4 | 54 |
| #5 | 65 |
| #6 | 75 |
| #7 | 84 |
| #8 | 92 |
| #9 | 99 |
| #10 | 105 |
| #11 | 110 |
| #12 | 117 |
| #13 | 119 |
| #14 | 120 |

Reference

<https://www.geeksforgeeks.org/puzzle-set-35-2-eggs-and-100-floors/>

<http://datagenetics.com/blog/july22012/index.html>