**NPTEL**

**NPTEL ONLINE CERTIFICATION COURSE**

**Discrete Mathematics**
**Recurrence Relation**

**Example: Door knocks example**

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Imagine a situation where a person walks in a hotel, and hotel rooms are arranged in a sequence and comes to the first room and does a knock-knock, checks, nobody's inside, and then goes to the next room does a knock-knock, nobody's inside, keeps doing it until the last door and then occupies the last, what's the intention? You'll get to know very soon, once he occupies, occupies the last door a second person comes and does the same thing knock-knock on the first door nobody's inside, knock-knock on the second, third, fourth, fifth and goes on till the last door and realize, oh there is someone here let me occupy the neighboring door, which means he goes until the end comes back one step and occupies the second last door, third person comes knock-knock on the first door, knock-knock on n the second, knock-knock-knock-knock-knock-knock and goes on till the N-1th door, realizes someone's there and then comes back and occupies the N-2 door, right, why did they do that I mean whatever is the reason, that's not important but let me cook up some story here, they want to stay next to someone and don't want to stay alone in a room maybe that could be the reason, in whatever be the reason the idea is they knock and find a room at the end, right, the question is what is the total number of knocks after N people occupy these end rooms?

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