

# Running Times

*The expected number of probes for find(key) under SUHA*

## Linear Probing:

- Successful:  $\frac{1}{2}(1 + 1/(1-\alpha))$
- Unsuccessful:  $\frac{1}{2}(1 + 1/(1-\alpha))^2$

*(Don't memorize these equations, no need.)*

## Double Hashing:

- Successful:  $1/\alpha * \ln(1/(1-\alpha))$
- Unsuccessful:  $1/(1-\alpha)$

Instead, observe:

- As  $\alpha$  increases:

## Separate Chaining:

- Successful:  $1 + \alpha/2$
- Unsuccessful:  $1 + \alpha$

- If  $\alpha$  is constant: