

Top Down Proof Demonstrations

Using propositions (No Variables)

Start from query and work backwards

Top Down Proof: ?- health. - Clause choice failure!

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.
```

Top Down Proof: ?- health. - Clause choice failure!

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.  
  
true ← health
```

Top Down Proof: ?- health. - Clause choice failure!

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.  
  
true ← health  
true ← sustenance ∧ shelter
```

Top Down Proof: ?- health. - Clause choice failure!

health \leftarrow sustenance \wedge shelter.

sustenance \leftarrow supermacs \wedge sweets.

sustenance \leftarrow bread \wedge water.

shelter \leftarrow house.

house.

water.

bread.

true \leftarrow health

true \leftarrow sustenance \wedge shelter

true \leftarrow supermacs \wedge sweets \wedge shelter

Top Down Proof: ?- health. - Clause choice failure!

health \leftarrow sustenance \wedge shelter.

sustenance \leftarrow supermacs \wedge sweets.

sustenance \leftarrow bread \wedge water.

shelter \leftarrow house.

house.

water.

bread.

true \leftarrow health

true \leftarrow sustenance \wedge shelter

true \leftarrow supermacs \wedge sweets \wedge shelter

true \leftarrow supermacs \wedge sweets \wedge house

Top Down Proof: ?- health. - Clause choice failure!

health \leftarrow sustenance \wedge shelter.

sustenance \leftarrow supermacs \wedge sweets.

sustenance \leftarrow bread \wedge water.

shelter \leftarrow house.

house.

water.

bread.

true \leftarrow health

true \leftarrow sustenance \wedge shelter

true \leftarrow supermacs \wedge sweets \wedge shelter

true \leftarrow supermacs \wedge sweets \wedge house

true \leftarrow supermacs \wedge sweets

Top Down Proof: ?- health. - Clause choice failure!

health \leftarrow sustenance \wedge shelter.

sustenance \leftarrow supermacs \wedge sweets.

sustenance \leftarrow bread \wedge water.

shelter \leftarrow house.

house.

water.

bread.

true \leftarrow health

true \leftarrow sustenance \wedge shelter

true \leftarrow supermacs \wedge sweets \wedge shelter

true \leftarrow supermacs \wedge sweets \wedge house

true \leftarrow supermacs \wedge sweets

Choice Failure - try another?

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.
```

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.  
  
true ← health
```

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.  
  
true ← health  
true ← sustenance ∧ shelter
```

health \leftarrow sustenance \wedge shelter.

sustenance \leftarrow supermacs \wedge sweets.

sustenance \leftarrow bread \wedge water.

shelter \leftarrow house.

house.

water.

bread.

true \leftarrow health

true \leftarrow sustenance \wedge shelter

true \leftarrow supermacs \wedge sweets \wedge shelter

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.
```

```
true ← health  
true ← sustenance ∧ shelter  
true ← bread ∧ water ∧ shelter
```

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.
```

```
true ← health  
true ← sustenance ∧ shelter  
true ← bread ∧ water ∧ shelter  
true ← bread ∧ water ∧ house
```

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.
```

```
true ← health  
true ← sustenance ∧ shelter  
true ← bread ∧ water ∧ shelter  
true ← bread ∧ water ∧ house  
true ← bread ∧ water
```

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.
```

```
true ← health  
true ← sustenance ∧ shelter  
true ← bread ∧ water ∧ shelter  
true ← bread ∧ water ∧ house  
true ← bread ∧ water  
true ← bread
```

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.
```

```
true ← health  
true ← sustenance ∧ shelter  
true ← bread ∧ water ∧ shelter  
true ← bread ∧ water ∧ house  
true ← bread ∧ water  
true ← bread  
true ←
```

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
water.  
bread.
```

```
true ← health  
true ← sustenance ∧ shelter  
true ← bread ∧ water ∧ shelter  
true ← bread ∧ water ∧ house  
true ← bread ∧ water  
true ← bread  
true ←
```

Top Down Proof: ?- health. - No clause works

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
sweets.  
bread.
```

Top Down Proof: ?- health. - No clause works

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
sweets.  
bread.  
  
true ← health
```

Top Down Proof: ?- health. - No clause works

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
sweets.  
bread.  
  
true ← health  
true ← sustenance ∧ shelter
```

Top Down Proof: ?- health. - No clause works

health \leftarrow sustenance \wedge shelter.

sustenance \leftarrow supermacs \wedge sweets.

sustenance \leftarrow bread \wedge water.

shelter \leftarrow house.

house.

sweets.

bread.

true \leftarrow health

true \leftarrow sustenance \wedge shelter

true \leftarrow supermacs \wedge sweets \wedge shelter

Top Down Proof: ?- health. - No clause works

health ← sustenance ∧ shelter.

sustenance ← supermacs ∧ sweets.

sustenance ← bread ∧ water.

shelter ← house.

house.

sweets.

bread.

true ← health

true ← sustenance ∧ shelter

true ← supermacs ∧ sweets ∧ shelter

true ← supermacs ∧ sweets ∧ house

Top Down Proof: ?- health. - No clause works

health ← sustenance ∧ shelter.

sustenance ← supermacs ∧ sweets.

sustenance ← bread ∧ water.

shelter ← house.

house.

sweets.

bread.

true ← health

true ← sustenance ∧ shelter

true ← supermacs ∧ sweets ∧ shelter

true ← supermacs ∧ sweets ∧ house

true ← supermacs ∧ sweets

Top Down Proof: ?- health. - No clause works

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
sweets.  
bread.
```

```
true ← health  
true ← sustenance ∧ shelter  
true ← supermacs ∧ sweets ∧ shelter  
true ← supermacs ∧ sweets ∧ house  
true ← supermacs ∧ sweets  
true ← supermacs
```

Top Down Proof: ?- health. - No clause works

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
sweets.  
bread.
```

```
true ← health  
true ← sustenance ∧ shelter  
true ← supermacs ∧ sweets ∧ shelter  
true ← supermacs ∧ sweets ∧ house  
true ← supermacs ∧ sweets  
true ← supermacs
```

Fails - now try other possible clause for conjunct sustenance.

Top Down Proof: ?- health. - No clause works

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true ← health  
true ← sustenance ∧ shelter  
true ← bread ∧ water ∧ shelter
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Top Down Proof: ?- health. - No clause works

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shelter ← house.  
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true ← health  
true ← sustenance ∧ shelter  
true ← bread ∧ water ∧ shelter  
true ← bread ∧ water ∧ house
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Top Down Proof: ?- health. - No clause works

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true ← health  
true ← sustenance ∧ shelter  
true ← bread ∧ water ∧ shelter  
true ← bread ∧ water ∧ house  
true ← bread ∧ water
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Top Down Proof: ?- health. - No clause works

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health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
sweets.  
bread.
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```
true ← health  
true ← sustenance ∧ shelter  
true ← bread ∧ water ∧ shelter  
true ← bread ∧ water ∧ house  
true ← bread ∧ water  
true ← water
```

Top Down Proof: ?- health. - No clause works

```
health ← sustenance ∧ shelter.  
sustenance ← supermacs ∧ sweets.  
sustenance ← bread ∧ water.  
shelter ← house.  
house.  
sweets.  
bread.
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```
true ← health  
true ← sustenance ∧ shelter  
true ← bread ∧ water ∧ shelter  
true ← bread ∧ water ∧ house  
true ← bread ∧ water  
true ← water
```

All possibilities fail for just one conjunct so the whole thing fails!