

Programming

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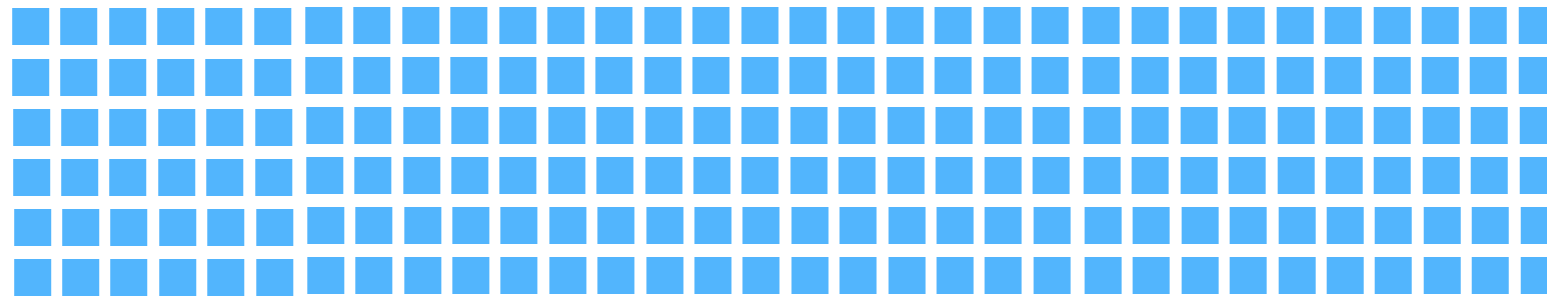
Uncertain **<T>**hings

Programs perform (probabilistic) inference, even if they don't realize it

They use **evidence** to draw **conclusions**

```
GeoCoordinate Loc = GPS.GetLocation ();  
if (GPS.Distance (Loc, Home) < 200) Evidence  
    OpenGarageDoor (); Conclusion
```

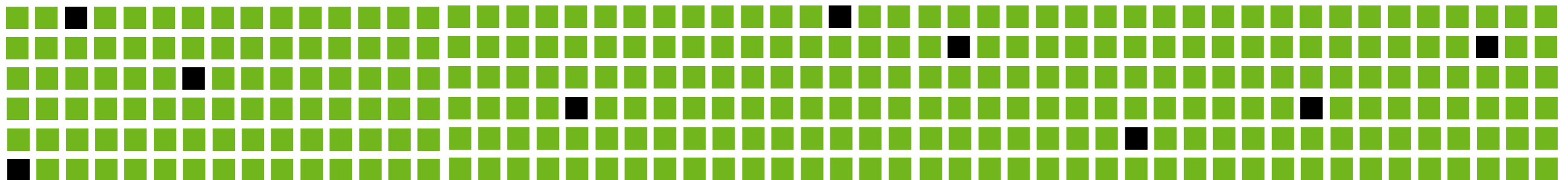
What do probabilistic programs mean?



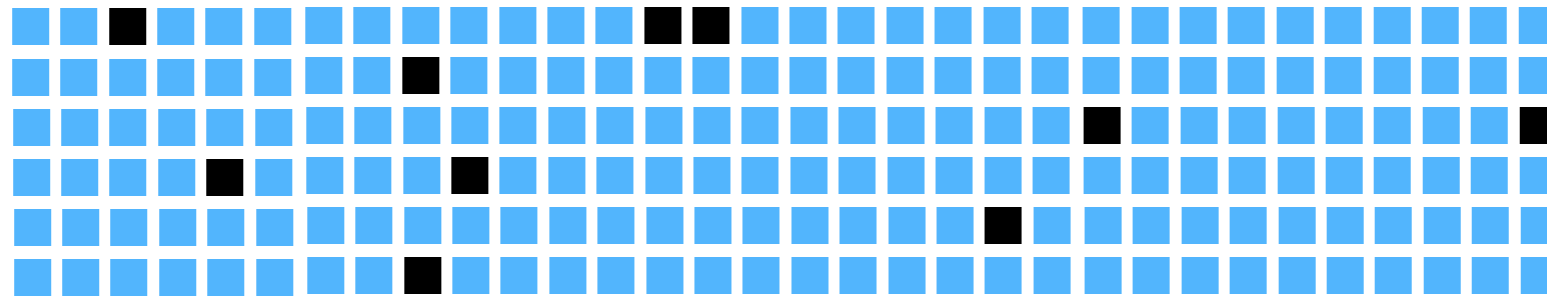
probabilistic
program

```
float obfuscated(float n) {  
    return n + gaussian(0.0, 1000.0);  
}  
float average_salary(float* salaries) {  
    total = 0.0;  
    for (int i = 0; i < COUNT; ++i)  
        total += obfuscated(salaries[i]);  
    avg = total / len(salaries);  
    p_avg = ...;  
    passert e, p, c  
}
```

?



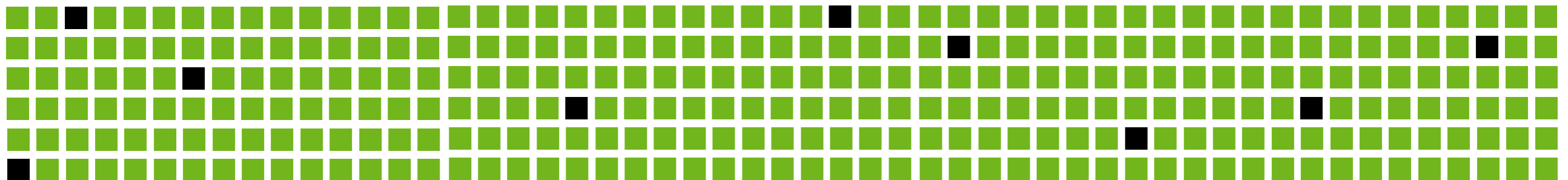
What if we could identify inputs that cause bad outputs?



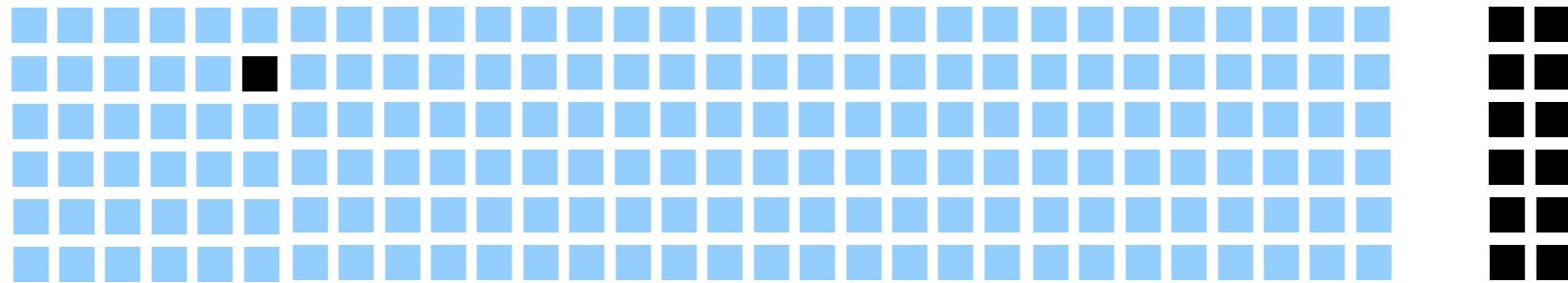
probabilistic
program

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}  
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    passert e, p, c  
}
```

?



Identifying when things go bad



probabilistic
program

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}  
float average_salary(float* salaries) {  
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}
```

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