



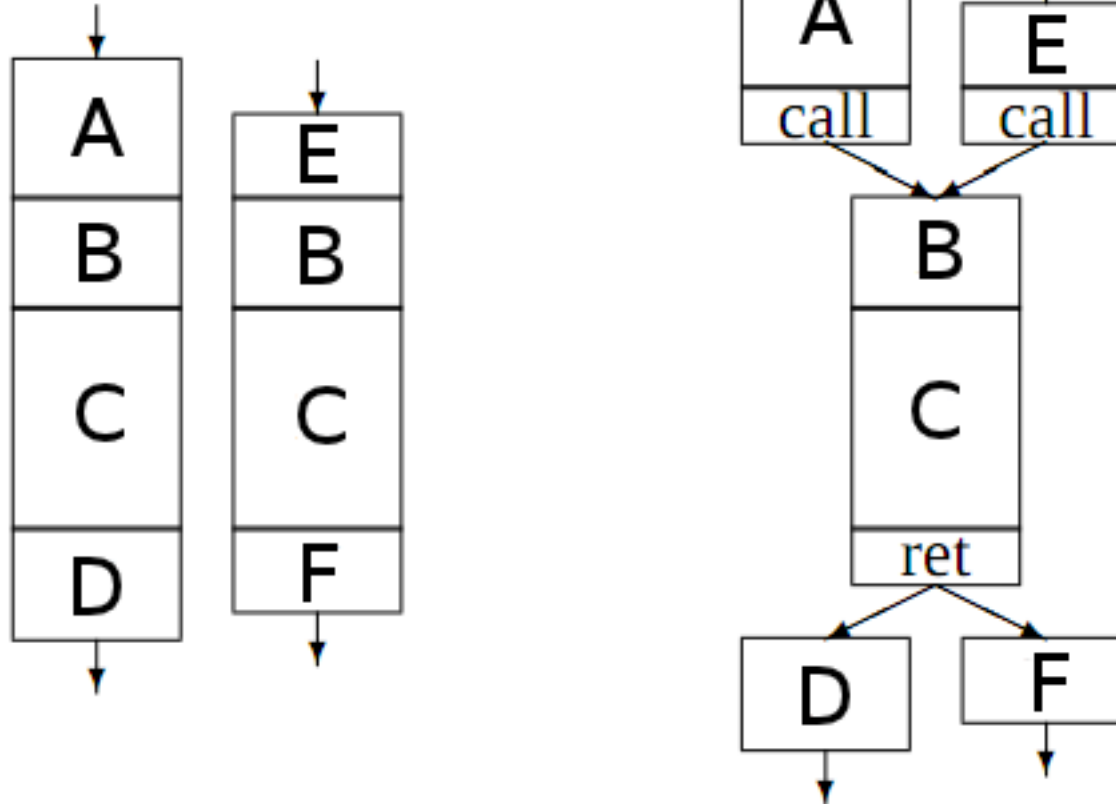
# Ideas for Improving Efficiency of Procedural Abstraction



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# Procedural abstraction



# Single Entry -Single Exit

- ▶ Advantages:
  - Less overhead
  - More abstractable code parts
- ▶ Disadvantages:
  - Higher computing complexity



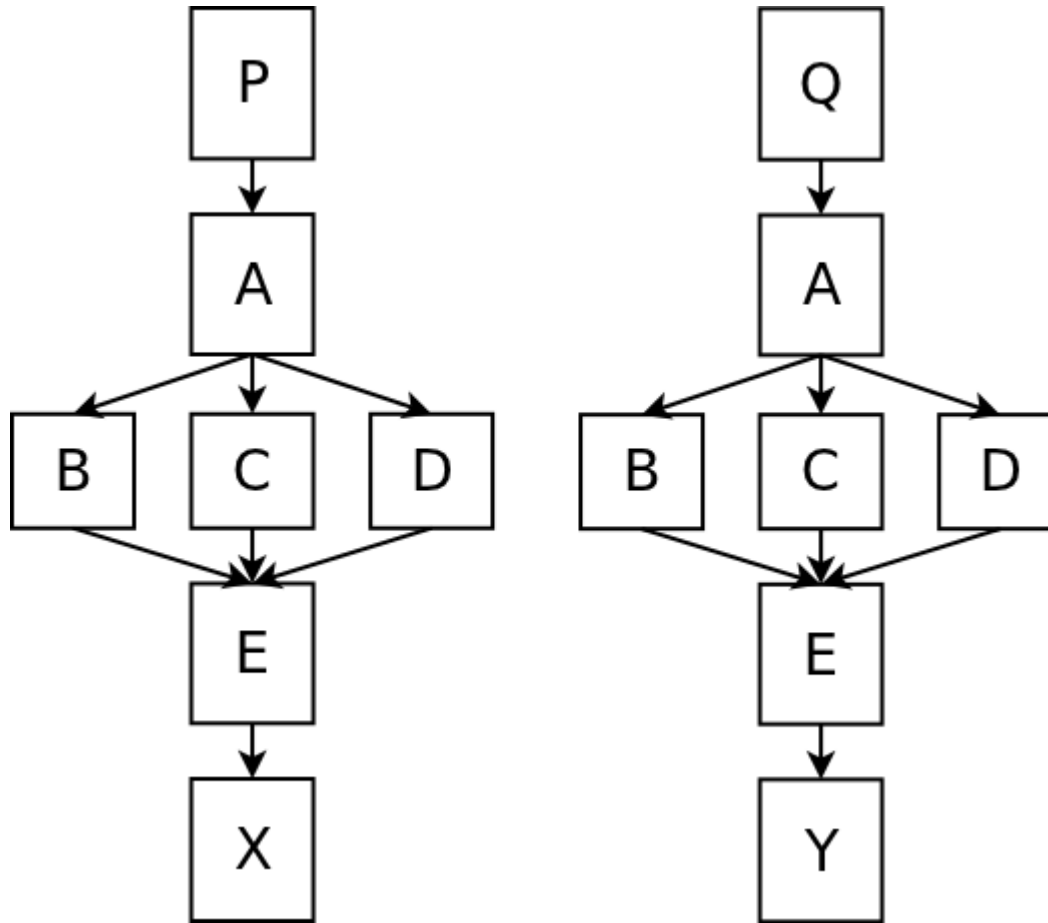
# Procedural abstraction

- ▶ Find equivalent sequences in the code
- ▶ Remove them except one
- ▶ Store the return address and insert a jump in place of removed sequences.
- ▶ Insert indirect jump to the end of this sequence



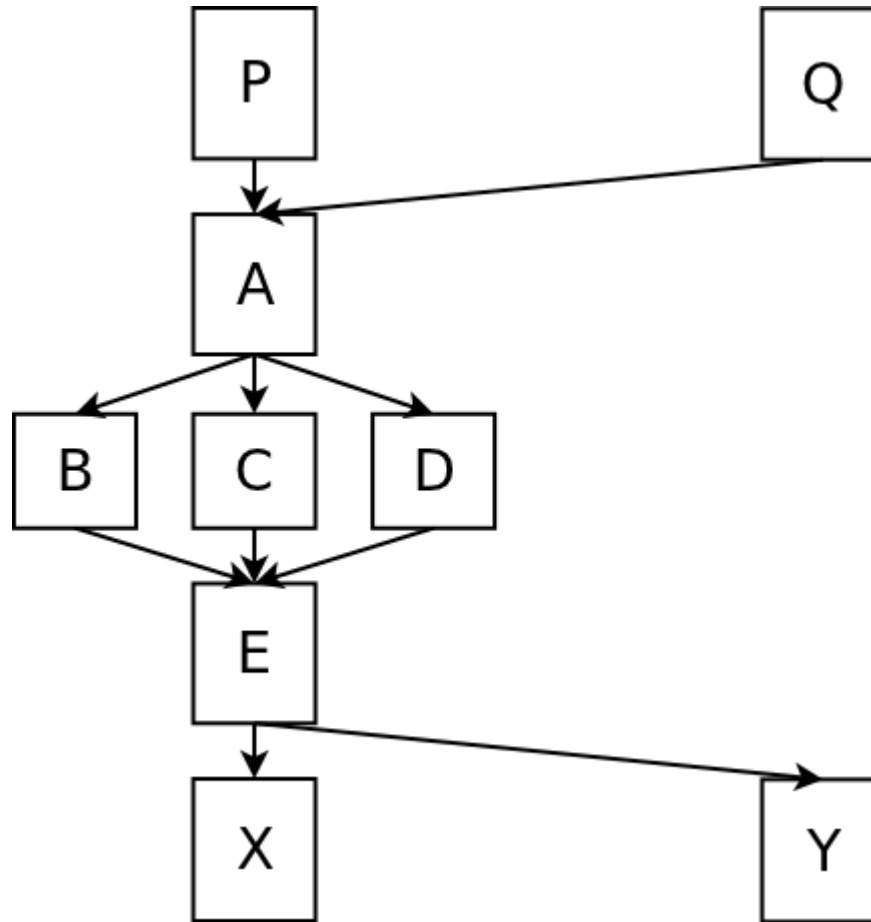


# Single Entry – Single Exit





# Single Entry – Single Exit



# Variable renaming

```
a = 1;
```

```
b = 3;
```

```
D.3251 = b * 2;
```

```
x = D.3251 + a;
```

```
D.3252 = (const char *  
restrict) &"%d\n"[0];
```

```
printf (D.3252, x);
```

```
D.3253 = 0;
```

```
return D.3253;
```

```
p = 1;
```

```
q = 3;
```

```
D.3251 = q * 2;
```

```
r = D.3251 + p;
```

```
D.3252 = (const char *  
restrict) &"%d\n"[0];
```

```
printf (D.3252, r);
```

```
D.3253 = 0;
```

```
return D.3253;
```



# Variable renaming

- ▶ Advantages:
  - More abstractable sequences
- ▶ Disadvantages:
  - Higher computing cost
  - Higher overhead (2 assigns per renamings)

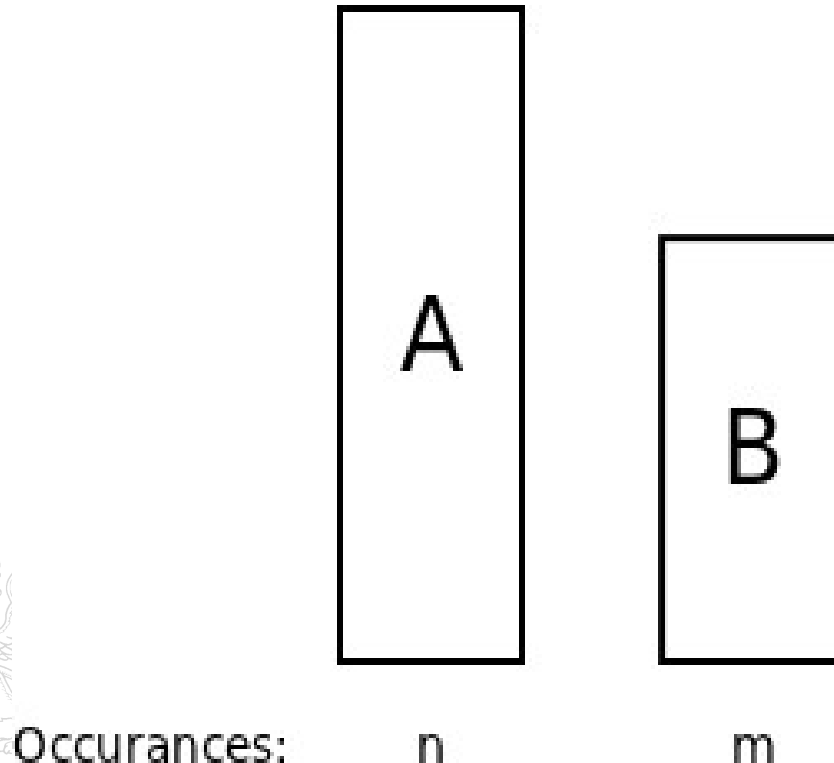






# Choosing strategy

- ▶ Current: The one with the most gain.



$$\begin{aligned} A &\supset B \\ n &< m \\ |A| * n &< |B| * m \end{aligned}$$

|X|: Yield of the abstraction  
of one X sequence

# Choosing strategy

- ▶ Is this strategy more optimal, than choose the longest one?
- ▶  $|A| * n + |B| * (m - n + 1) < |B| * m$  ?  
 $|A| * n < |B| * (n - 1)$  ?
- ▶ It is not.



# Choosing strategy

- ▶ Is this strategy more optimal, than choose the longest one?
- ▶  $|A| * n + |B| * (m - n + 1) < |B| * m$  ?  
 $|A| * n < |B| * (n - 1)$  ?
- ▶ It is not.





Thanks for your patience!

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