

The following program doesn't type-check according to the rules given in the course:

```
int x;
int y;
if (1 > 42)
  {return x}
else
  {return y}
x := y;
```

Let's try to find a type derivation:

$$\begin{array}{c}
 \text{!!!ERROR!!!} \\
 \hline
 \frac{\{(x, Int)\} \oplus \{(y, Int)\} \vdash f(1 > 42) \{return\ x\} \text{ else } \{return\ y\} : Void \quad \{(x, Int)\} \oplus \{(y, Int)\} \vdash x := y : T_0}{\{(x, Int)\} \oplus \{(y, Int)\} \vdash \text{if}(1 > 42) \{return\ x\} \text{ else } \{return\ y\} x := y; : T_0} \\
 \hline
 \frac{\{(x, Int)\} \vdash \text{int } y; \text{if}(1 > 42) \{return\ x\} \text{ else } \{return\ y\} x := y; : T_0}{\text{int } x; \text{int } y; \text{if}(1 > 42) \{return\ x\} \text{ else } \{return\ y\} x := y; : T_0}
 \end{array}$$