With additional typing rules, the following program type-checks according to the rules given in the course:

```
Class C {
  int f(int x) {
    return 1+f(x);
  }
}
```

The new typing rules are:

$$\frac{\Gamma \vdash x : Int \qquad \Gamma \vdash y : Int}{\Gamma \vdash (x + y) : Int}$$

Here is the derivation tree:

$$\dfrac{\dfrac{(f, Int \to Int) \in \{(f, Int \to Int)\}}{\{(f, Int \to Int)\} \vdash f : Int \to Int} \qquad \dfrac{\dfrac{\vdash 1 : Int}{\{(f, Int \to Int), (x, Int)\} \vdash 1 : Int} \qquad \dfrac{\dfrac{(x, Int) \in \{(f, Int \to Int), (x, Int)\}}{\{(f, Int \to Int), (x, Int)\} \vdash x : Int} \qquad \dfrac{(f, Int \to Int) \in \{(f, Int \to Int), (x, Int)\}}{\{(f, Int \to Int), (x, Int)\} \vdash f : Int \to Int}}{\{(f, Int \to Int), (x, Int)\} \vdash f(x) \ : Int}}{\{(f, Int \to Int), (x, Int)\} \vdash 1 + f(x) \ : Int}}{\{(f, Int \to Int), (x, Int)\} \vdash return\, 1 + f(x) \ : Int}}{\{(f, Int \to Int)\} \vdash int\, f(int\, x)\, \{\, return\, 1 + f(x);\, \} : Void}$$