ASTs for Control Structures
AST design

• Syntactically, control structures are **statements** just like assignment statements

  \[
  \text{statement} : \quad \text{base stmt } ';;'
  \]

  \[
  \text{| if stmt}
  \]

  \[
  \text{| while stmt ;}
  \]

  \[
  \text{base stmt} : \quad \text{assign stmt}
  \]

  \[
  \text{| read stmt}
  \]

  \[
  \text{| print stmt}
  \]

  \[
  \text{| return stmt ;}
  \]

• AST Nodes subclass from a StatementNode abstract class
  
  • IfStatement
  
  • WhileStatement

• Key difference: if statements and while loops can have more statements nested inside
if statements

\[
\text{if (cond_expr) \{ \\
\hspace{1em} \text{stmt_list_1} \\\n\hspace{1em} \}} \text{ else \{} \\
\hspace{1em} \text{stmt_list_2} \\\n\hspace{1em} \}\]

while loops

```
while (<cond_expr>) {
    <stmt_list>
}
```
for loops

for (<init_stmt>;<cond_expr>;<update_stmt>) {
    <stmt_list>
}
next: generating code for control structures