Quiz 6 Solution
Quiz 6 Solution

Prog -> StmtSeq
StmtSeq -> Stmt StmtSeq
StmtSeq -> ε
Stmt -> Id = Expr ;
Expr -> Expr || Term
Expr -> Term
Term -> Term && Factor
Term -> Factor
Factor -> ! Factor
Factor -> ( Expr )
Factor -> Id
Factor -> True
Factor -> False

x = True;
y = False;
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Quiz 6.1 Solution

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Quiz 6.1 Solution

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Quiz 6.1 Solution

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Quiz 6.1 Solution

```
\text{Prog} \rightarrow \text{StmtSeq}
\text{StmtSeq} \rightarrow \text{Stmt} \text{ StmtSeq}
\text{StmtSeq} \rightarrow \varepsilon
\text{Stmt} \rightarrow \text{Id} = \text{Expr} ;
\text{Expr} \rightarrow \text{Expr} || \text{Term}
\text{Expr} \rightarrow \text{Term}
\text{Term} \rightarrow \text{Term} && \text{Factor}
\text{Term} \rightarrow \text{Factor}
\text{Factor} \rightarrow \neg \text{Factor}
\text{Factor} \rightarrow ( \text{Expr} )
\text{Factor} \rightarrow \text{Id}
\text{Factor} \rightarrow \text{True}
\text{Factor} \rightarrow \text{False}
```

\[ w = x && y || z \]

\[ x = \text{True}; \]
\[ y = \text{False}; \]
\[ z = \text{True}; \]

\[ w = x && y || z \]
Quiz 6.1 Solution

x = True;
y = False;
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Quiz 6.1 Solution

\[
x = \text{True};
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\[
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z = \text{True};
\]
\[
w = x \&\& y || z
\]
Quiz 6.1 Solution

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Progs $\rightarrow$ StmtSeq
StmtSeq $\rightarrow$ Stmt StmtSeq
StmtSeq $\rightarrow$ ε
Stmt $\rightarrow$ Id = Expr ;
Expr $\rightarrow$ Expr || Term
Expr $\rightarrow$ Term
Term $\rightarrow$ Term && Factor
Term $\rightarrow$ Factor
Factor $\rightarrow$ ! Factor
Factor $\rightarrow$ ( Expr )
Factor $\rightarrow$ Id
Factor $\rightarrow$ True
Factor $\rightarrow$ False
Quiz 6.2 Solution

x = True;
y = False;
z = True;
w = x && y|| z

Prog -> StmtSeq
StmtSeq -> Stmt StmtSeq
StmtSeq -> ε
Stmt -> Id = Expr ;
Expr -> Expr || Term
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(id, x) = Expr ;
(id, y) = Expr ;
(id, z) = Expr ;
(id, w) = Expr ;
(id, y) = Expr ;
(id, z) = Expr ;

Quiz 6.2 Solution

\[ x = \text{True}; \]
\[ y = \text{False}; \]
\[ z = \text{True}; \]
\[ w = x \&\& y|| z \]
Quiz 6.2 Solution

x = True;
y = False;
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The diagram shows the parse tree with the following context:

```
Prog -> StmtSeq
StmtSeq -> Stmt StmtSeq
StmtSeq -> ε
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Expr -> Term
Term -> Term && Factor
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Factor -> ! Factor
Factor -> ( Expr )
Factor -> Id
Factor -> True
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```

The parse tree includes nodes for

- Id: x, y, z
- Expr: (id, x), (id, y), (id, z)
- Term: (id, w)
- Factor: True, False

The tree structure reflects the syntax rules and the given boolean expressions.
Quiz 6.2 Solution

Prog -> StmtSeq
StmtSeq -> Stmt StmtSeq
StmtSeq -> ε
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x = True;
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Quiz 6.2 Solution

Prog -> StmtSeq
StmtSeq -> Stmt StmtSeq
StmtSeq -> \(\varepsilon\)
Stmt -> Id = Expr ;
Expr -> Expr || Term
Expr -> Term
Term -> Term && Factor
Term -> Factor
Factor -> ! Factor
Factor -> ( Expr )
Factor -> Id
Factor -> True
Factor -> False

\begin{align*}
x &= True; \\
y &= False; \\
z &= True; \\
w &= x && y || z
\end{align*}
Quiz 6.2 Solution

\[
x = \text{True}; \\
y = \text{False}; \\
z = \text{True}; \\
w = x \&\& y || z
\]

\[
\text{Prog} \to \text{StmtSeq} \\
\text{StmtSeq} \to \text{Stmt} \text{ StmtSeq} \\
\text{StmtSeq} \to \epsilon \\
\text{Stmt} \to \text{Id} = \text{Expr} ; \\
\text{Expr} \to \text{Expr} || \text{Term} \\
\text{Expr} \to \text{Term} \\
\text{Term} \to \text{Term} && \text{Factor} \\
\text{Term} \to \text{Factor} \\
\text{Factor} \to \neg \text{Factor} \\
\text{Factor} \to ( \text{Expr} ) \\
\text{Factor} \to \text{Id} \\
\text{Factor} \to \text{True} \\
\text{Factor} \to \text{False}
\]
Quiz 6.2 Solution

Prog -> StmtSeq
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x = True;
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Quiz 6.2 Solution

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Produce:
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StmtSeq - Stmt StmtSeq
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x = True;
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```
(id, x) = Expr ;
(id, y) = Expr ;
(id, z) = Expr ;
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x = True;
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\[
x = \text{True}; \\
y = \text{False}; \\
z = \text{True}; \\
w = x \&\& y \| z
\]

\[
\begin{align*}
\text{Prog} & \rightarrow \text{StmtSeq} \\
\text{StmtSeq} & \rightarrow \text{Stmt} \text{ StmtSeq} \\
\text{StmtSeq} & \rightarrow \epsilon \\
\text{Stmt} & \rightarrow \text{Id} = \text{Expr}; \\
\text{Expr} & \rightarrow \text{Expr} \| \text{Term} \\
\text{Expr} & \rightarrow \text{Term} \\
\text{Term} & \rightarrow \text{Term} \&\& \text{Factor} \\
\text{Term} & \rightarrow \text{Factor} \\
\text{Factor} & \rightarrow \text{!} \text{ Factor} \\
\text{Factor} & \rightarrow ( \text{Expr} ) \\
\text{Factor} & \rightarrow \text{Id} \\
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(id, z) = Expr ;
(id, z) = Expr ;
(id, x) = Expr ;
Quiz 6.2 Solution

Progs are built from StmtSeqs, which are built from statements, which are built from expressions, which are built from terms, which are built from factors.

x = True;
y = False;
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w = x && y|| z
Quiz 6.2 Solution

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Quiz 6.2 Solution

```plaintext
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