

# Predictive Parsing - First and Follow Sets

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To know possible first terminal symbols of each production, we need to calculate the Nullable, First and Follow sets

$Z \rightarrow X Y Z$   
 $Z \rightarrow d$

$Y \rightarrow c$   
 $Y \rightarrow$

$X \rightarrow a$   
 $X \rightarrow Y$

	nullable	first	follow
Z			
Y			
X			

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To know possible first terminal symbols of each production, we need to calculate the **Nullable**, First and Follow sets

$Z \rightarrow X Y Z$   
 $Z \rightarrow d$

$Y \rightarrow c$   
 $Y \rightarrow$

$X \rightarrow a$   
 $X \rightarrow Y$

	nullable	first	follow
Z	False		
Y	False		
X	False		

Initialize nullable

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 $X \rightarrow Y$

	nullable	first	follow
Z	False		
Y	True		
X	True		

Stop iteration

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 $Z \rightarrow d$

$Y \rightarrow c$   
 $Y \rightarrow$

$X \rightarrow a$   
 $X \rightarrow Y$

	nullable	first	follow
Z	False	{ }	
Y	True	{ }	
X	True	{ }	

Initialize first sets

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$Z \rightarrow X Y Z$

$Z \rightarrow d$

$Y \rightarrow c$

$Y \rightarrow$

$X \rightarrow a$

$X \rightarrow Y$

	nullable	first	follow
Z	False	{ }	
Y	True	{ }	
X	True	{ }	

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	nullable	first	follow
Z	False	{d}	
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X	True	{a}	

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	nullable	first	follow
Z	False	{d}	
Y	True	{c}	
X	True	{a}	

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$Z \rightarrow X Y Z$   
 $Z \rightarrow d$

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 $Y \rightarrow$

$X \rightarrow a$

$X \rightarrow Y$

	nullable	first	follow
Z	False	{d}	
Y	True	{c}	
X	True	{a, c}	

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$Z \rightarrow X Y Z$

$Z \rightarrow d$

$Y \rightarrow c$

$Y \rightarrow$

$X \rightarrow a$

$X \rightarrow Y$

	nullable	first	follow
Z	False	{d, a, c}	
Y	True	{c}	
X	True	{a, c}	



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To know possible first terminal symbols of each production, we need to calculate the Nullable, **First** and Follow sets

$$\begin{array}{lll} \boxed{Z \rightarrow XYZ} & \boxed{Y \rightarrow c} & \boxed{X \rightarrow a} \\ \boxed{Z \rightarrow d} & \boxed{Y \rightarrow} & X \rightarrow Y \end{array}$$

	nullable	first	follow
Z	False	{d, a, c}	
Y	True	{c}	
X	True	{a, c}	

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 $Z \rightarrow d$

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 $Y \rightarrow$

$X \rightarrow a$   
 $X \rightarrow Y$

	nullable	first	follow
Z	False	{d, a, c}	
Y	True	{c}	
X	True	{a, c}	

Iterate again.  
No change.  
Stop iteration.

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 $Z \rightarrow d$

$Y \rightarrow c$   
 $Y \rightarrow$

$X \rightarrow a$   
 $X \rightarrow Y$

	nullable	first	follow
Z	False	{d, a, c}	{ }
Y	True	{c}	{ }
X	True	{a, c}	{ }

Initialize follow sets

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To know possible first terminal symbols of each production, we need to calculate the Nullable, First and Follow sets

$Z \rightarrow X Y Z$   
 $Z \rightarrow d$

$Y \rightarrow c$   
 $Y \rightarrow$

$X \rightarrow a$   
 $X \rightarrow Y$

	nullable	first	follow
Z	False	{d, a, c}	{ }
Y	True	{c}	{d, a, c}
X	True	{a, c}	{c, d, a}

First(Z) = ?

First(YZ) = ?

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$X \rightarrow Y$

	nullable	first	follow
Z	False	{d, a, c}	{}
Y	True	{c}	{d, a, c}
X	True	{a, c}	{c, d, a}

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$Z \rightarrow X Y Z$   
 $Z \rightarrow d$

$Y \rightarrow c$   
 $Y \rightarrow$

$X \rightarrow a$

$X \rightarrow Y$

	nullable	first	follow
Z	False	{d, a, c}	{}
Y	True	{c}	{d, a, c}
X	True	{a, c}	{c, d, a}

Follow(Y) =  
Follow(X)  $\cup$   
Follow(Y)