Rexx Parse Templates

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Instruction Format - Source

PARSE [UPPER] *source* *template*

- *source*

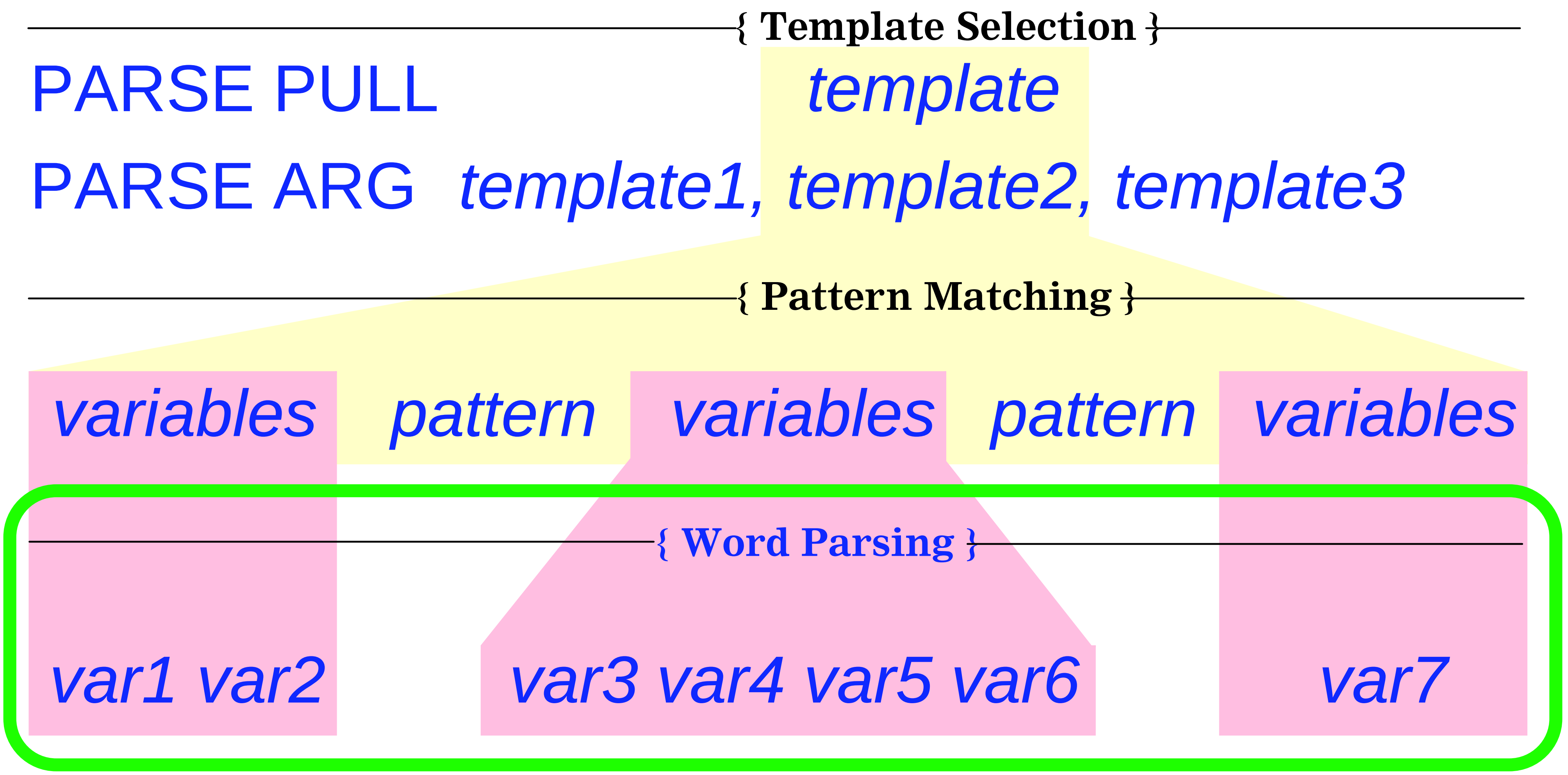
• ARG	invocation argument(s)
• LINEIN	next line from STDIN
• PULL	top line of stack
• SOURCE	info about running program
• VALUE	expression
• VAR	contents of a variable
• VERSION	info about interpreter

Instruction Format - Template

PARSE [UPPER] *source* *template*

- *template*
  - data variables `rec2 rlen food bard`
  - placeholder periods `.`
  - explicit patterns
    - absolute position `12 =42`
    - relative position `+8 -4`
    - literal `'/' "total=" '09'x`
  - variable reference patterns `(delim)(pattrn3)`

Parsing Hierarchy



Instruction Format - Template

PARSE [UPPER] *source* *template*

- *template*
  - data variables `rec2 rlen food bard`
  - placeholder periods `.`

Word Parsing

- Each variable in template is assigned a word of the data string
  - All leading blanks are removed
  - <u>One trailing blank</u> is removed
  - **Exception -** last variable in template:
    - No blanks are removed
    - Rest of data string assigned to last variable
- If no data, null string is assigned to variable
- Placeholder periods ignore data word
- Every variable <u>will</u> get a new value

Word Parsing (1)

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "

*-* Parse Var str v1 v2 v3 . v4 v5 . v6 v7 v8
  v1 > __________________________________________
  v2 > __________________________________________
  v3 > __________________________________________
   . > __________________________________________
  v4 > __________________________________________
  v5 > __________________________________________
   . > __________________________________________
  v6 > __________________________________________
  v7 > __________________________________________
  v8 > __________________________________________
```

Word Parsing (1)

```
       ....|....1....|....2....|....3....|....4
   str> " We have  met the enemy, and  he is us. "

 *-* Parse Var str v1 v2 v3 . v4 v5 . v6 v7 v8
   v1 > "We"
   v2 > "have"
   v3 > "met"
    . > "the"
   v4 > "enemy,"
   v5 > "and"
    . > "he"
   v6 > "is"
   v7 > "us."
   v8 > ""
```

Word Parsing (2)

```
         ....|....1....|....2....|....3....|....4
   str> " We have  met the enemy, and  he is us. "

 *-* Parse Var str v1 v2 v3 . v4 v5 v6
   v1 > __________________________________________
   v2 > __________________________________________
   v3 > __________________________________________
    . > __________________________________________
   v4 > __________________________________________
   v5 > __________________________________________
   v6 > __________________________________________
```

Word Parsing (2)

```
        ....|....1....|....2....|....3....|....4
    str> " We have  met the enemy, and  he is us. "

  *-* Parse Var str v1 v2 v3 . v4 v5 v6
    v1 > "We"
    v2 > "have"
    v3 > "met"
     . > "the"
    v4 > "enemy,"
    v5 > "and"
    v6 > " he is us. "
```

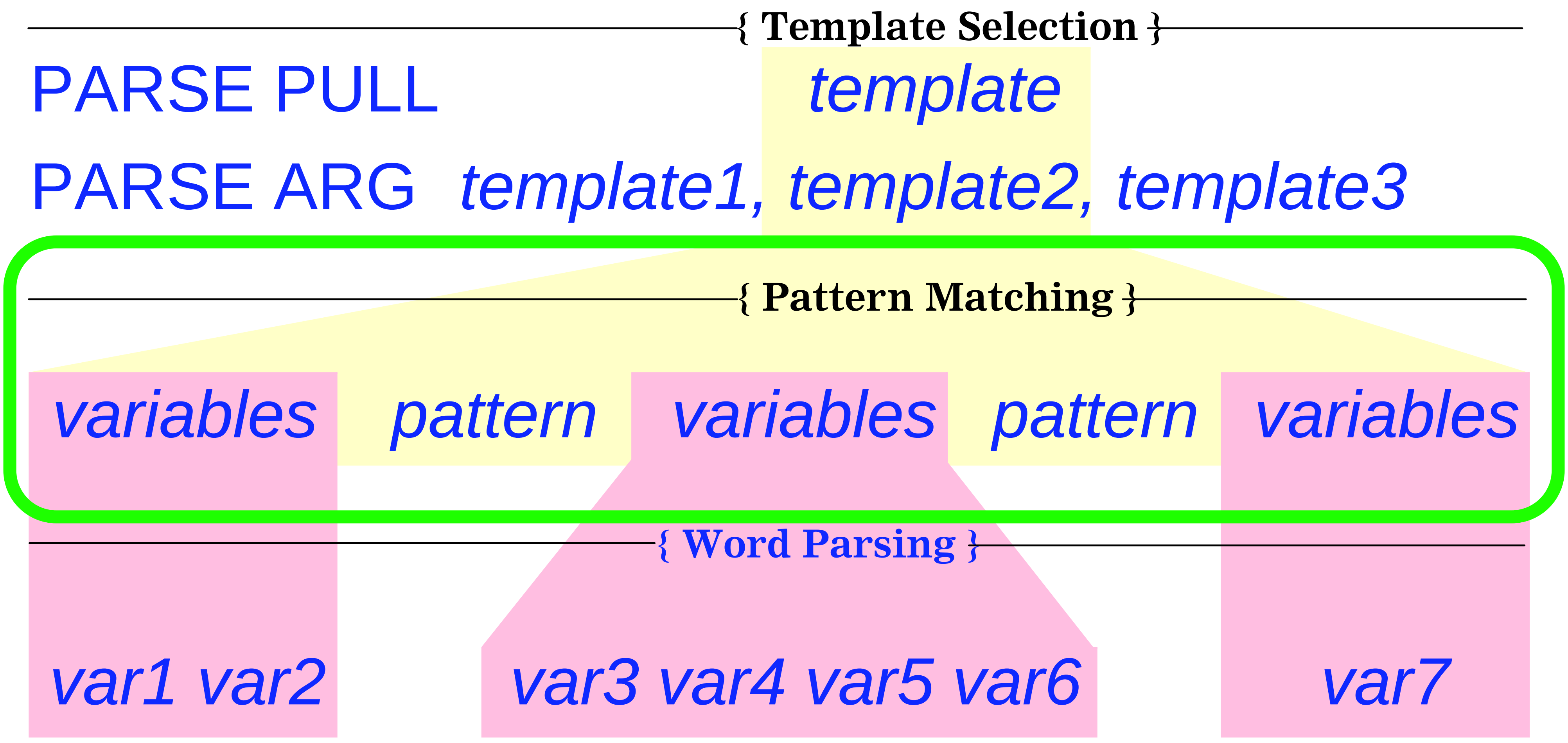
Word Parsing (3)

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "

*-* Parse Var str v1
  v1 > __________________________________________
```

Word Parsing (3)

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "

*-* Parse Var str v1
  v1 > " We have  met the enemy, and  he is us. "
```

Parsing Hierarchy



Instruction Format - Template

PARSE [UPPER] *source* *template*

- *template*
  - data variables `rec2 rlen food bard`
  - placeholder periods `.`
  - explicit patterns
    - absolute position `12 =42`

Position Pattern Parsing

- 1. Find Start Point in the data string
- 2. Find Match Point in the data string
- 3. WordParse the data substring into the variables between the template patterns

Find Start Point

- If beginning of template
  - SP = first character of data
- If a previous MP position pattern
  - SP = that character position in the data

Find Match Point

- If no more patterns in the template
  - MP = end of data + 1

- If another pattern in the template
  - MP = char position of <u>start</u> of next pattern

WordParse the Data

- Extract the data string from the StartPoint to, <u>but not including</u>, the MatchPoint

- WordParse this string into the variable(s) between the template patterns

Absolute Position Patterns (1)>

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
        S        M
*-* Parse Var str 1 v1 =10 v2 v3 v4 17 v5 =25 v6
  v1 > __________________________________________
  v2 > __________________________________________
  v3 > __________________________________________
  v4 > __________________________________________
  v5 > __________________________________________
  v6 > __________________________________________
```

Absolute Position Patterns (1)>

```
         ....|....1....|....2....|....3....|....4
    str> " We have  met the enemy, and  he is us. "
         S         M
  *-* Parse Var str 1 v1 =10 v2 v3 v4 17 v5 =25 v6
    v1 > " We have "
    v2 > ___________________________________________
    v3 > ___________________________________________
    v4 > ___________________________________________
    v5 > ___________________________________________
    v6 > ___________________________________________
```

Absolute Position Patterns (1)>

```
        ....|....1....|....2....|....3....|....4
    str> " We have  met the enemy, and  he is us. "
                   S      M
  *-* Parse Var str 1 v1 =10 v2 v3 v4 17 v5 =25 v6
    v1 > " We have "
    v2 > "met"
    v3 > "th"
    v4 > ""
    v5 > __________________________________________
    v6 > __________________________________________
```

Absolute Position Patterns (1)>

```
          ....|....1....|....2....|....3....|....4
    str> " We have  met the enemy, and  he is us. "
                              S       M
  *-* Parse Var str 1 v1 =10 v2 v3 v4 17 v5 =25 v6
    v1 > " We have "
    v2 > "met"
    v3 > "th"
    v4 > ""
    v5 > "e enemy,"
    v6 > __________________________________________
```

Absolute Position Patterns (1)

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
                                S               M
*-* Parse Var str 1 v1 =10 v2 v3 v4 17 v5 =25 v6
  v1 > " We have "
  v2 > "met"
  v3 > "th"
  v4 > ""
  v5 > "e enemy,"
  v6 > " and  he is us. "
```

Instruction Format - Template

PARSE [UPPER] *source* *template*

- *template*
  - data variables `rec2 rlen food bard`
  - placeholder periods `.`
  - explicit patterns
    - absolute position `12 =42`
    - relative position `+8 -4`

Find Start Point

- If beginning of template
  - SP = first character of data

- If absolute position pattern (**8   =42**)
  - SP = that character position in the data

- If relative position pattern (**+57   -2**)
  - SP = (previous MP + pattern) char position

Relative Position Patterns (1)>

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
        S        M
*-* Parse Var str 1 v1 +9 v2 v3 v4 +7 v5 +8 v6
  v1 > __________________________________________
  v2 > __________________________________________
  v3 > __________________________________________
  v4 > __________________________________________
  v5 > __________________________________________
  v6 > __________________________________________
```

Relative Position Patterns (1)>

```
       ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
        S        M
*-* Parse Var str 1 v1 +9 v2 v3 v4 +7 v5 +8 v6
  v1 > " We have "
  v2 > __________________________________________
  v3 > __________________________________________
  v4 > __________________________________________
  v5 > __________________________________________
  v6 > __________________________________________
```

Relative Position Patterns (1)>

```
         ....|....1....|....2....|....3....|....4
   str> " We have  met the enemy, and  he is us. "
                 S      M
*-* Parse Var str 1 v1 +9 v2 v3 v4 +7 v5 +8 v6
   v1 > " We have "
   v2 > "met"
   v3 > "th"
   v4 > ""
   v5 > __________________________________________
   v6 > __________________________________________
```

Relative Position Patterns (1) >

```
         ....|....1....|....2....|....3....|....4
    str> " We have  met the enemy, and  he is us. "
                                S       M
  *-* Parse Var str 1 v1 +9 v2 v3 v4 +7 v5 +8 v6
    v1 > " We have "
    v2 > "met"
    v3 > "th"
    v4 > ""
    v5 > "e enemy,"
    v6 > __________________________________________
```

Relative Position Patterns (1)

```
          ....|....1....|....2....|....3....|....4
    str> " We have  met the enemy, and  he is us. "
                                 S               M
  *-* Parse Var str 1 v1 +9 v2 v3 v4 +7 v5 +8 v6
    v1 > " We have "
    v2 > "met"
    v3 > "th"
    v4 > ""
    v5 > "e enemy,"
    v6 > " and  he is us. "
```

Find Match Point

- If no more patterns in the template
    - MP = end of data + 1
- If another pattern in the template
    - MP = char position of <u>start</u> of next pattern
    - If MP <= SP (not moving forward in the data)
        - MP = end of data + 1

Absolute Position Patterns (2)>

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
                                S               M
*-* Parse Var str 1 v1 =10 v2 v3 v4 17 v5 =25 v6 1 v7 v8
  v1 > " We have "
  v2 > "met"
  v3 > "th"
  v4 > ""
  v5 > "e enemy,"
  v6 > " and  he is us. "
  v7 > __________________________________________
  v8 > __________________________________________
```

Absolute Position Patterns (2)

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
        S                                       M
*-* Parse Var str 1 v1 =10 v2 v3 v4 17 v5 =25 v6 1 v7 v8
  v1 > " We have "
  v2 > "met"
  v3 > "th"
  v4 > ""
  v5 > "e enemy,"
  v6 > " and  he is us. "
  v7 > "We"
  v8 > "have  met the enemy, and  he is us. "
```

Absolute Position Patterns (3)>

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
        S                       M
*-* Parse Var str 1 v1 =25 v2 =15 . v3 =19 v4 =5 v5
  v1 > " We have  met the enemy,"
  v2 > __________________________________________
  v3 > __________________________________________
  v4 > __________________________________________
  v5 > __________________________________________
```

Absolute Position Patterns (3)>

```
         ....|....1....|....2....|....3....|....4
     str> " We have  met the enemy, and  he is us. "
                                        S                M
   *-* Parse Var str 1 v1 =25 v2 =15 . v3 =19 v4 =5 v5
     v1 > " We have  met the enemy,"
     v2 > " and  he is us. "
     v3 > __________________________________________
     v4 > __________________________________________
     v5 > __________________________________________
```

Absolute Position Patterns (3)>

```
         ....|....1....|....2....|....3....|....4
    str> " We have  met the enemy, and  he is us. "
                              S   M
  *-* Parse Var str 1 v1 =25 v2 =15 . v3 =19 v4 =5 v5
    v1 > " We have  met the enemy,"
    v2 > " and  he is us. "
    v3 > ""
    v4 > ______________________________________________
    v5 > ______________________________________________
```

Absolute Position Patterns (3)>

```
        ....|....1....|....2....|....3....|....4
    str> " We have  met the enemy, and  he is us. "
                             S                     M
  *-* Parse Var str 1 v1 =25 v2 =15 . v3 =19 v4 =5 v5
    v1 > " We have  met the enemy,"
    v2 > " and  he is us. "
    v3 > ""
    v4 > "enemy, and  he is us. "
    v5 > __________________________________________
```

Absolute Position Patterns (3)

```
        ....|....1....|....2....|....3....|....4
    str> " We have  met the enemy, and  he is us. "
              S                                    M
  *-* Parse Var str 1 v1 =25 v2 =15 . v3 =19 v4 =5 v5
    v1 > " We have  met the enemy,"
    v2 > " and  he is us. "
    v3 > ""
    v4 > "enemy, and  he is us. "
    v5 > "have  met the enemy, and  he is us. "
```

Relative Position Patterns (3)

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "

*-* Parse Var str 1 v1 +24 v2 -10 . v3 +4 v4 -14 v5
  v1 > ___________________________________________
  v2 > ___________________________________________
  v3 > ___________________________________________
  v4 > ___________________________________________
  v5 > ___________________________________________
```

Relative Position Patterns (3)

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "

*-* Parse Var str 1 v1 +24 v2 -10 . v3 +4 v4 -14 v5
  v1 > " We have  met the enemy,"
  v2 > " and  he is us. "
  v3 > ""
  v4 > "enemy, and  he is us. "
  v5 > "have  met the enemy, and  he is us. "
```

Fields - Absolute

```
         ....|....1....|....2....|....3....|....4
     str> " We have  met the enemy, and  he is us. "

   *-* Parse Var str  =2 v1  =4 . ,
                      =5 v2  =9 . ,
                     =11 v3 =14 . ,
                     =15 v4 =18 . ,
                     =19 v5 =24 . ,
                     =26 v6 =29 . ,
                     =31 v7
     v1 > "We"
     v2 > "have"
     v3 > "met"
     v4 > "the"
     v5 > "enemy"
     v6 > "and"
     v7 > "he is us. "
```

Fields - Absolute

```
          ....|....1....|....2....|....3....|....4
      str> " We have  met the enemy, and  he is us. "

    *-* Parse Var str  =2 v1 +2 ,
                       =5 v2 +4 ,
                      =11 v3 +3 ,
                      =15 v4 +3 ,
                      =19 v5 +5 ,
                      =26 v6 +3 ,
                      =31 v7
      v1 > "We"
      v2 > "have"
      v3 > "met"
      v4 > "the"
      v5 > "enemy"
      v6 > "and"
      v7 > "he is us. "
```

String Pattern Parsing

- 1. Find Start Point in the data string
- 2. Find Match Point in the data string
- 3. WordParse the data substring into the variables between the template patterns

Find Start Point

- If beginning of template
  - SP = first character of data

- If literal pattern (`","`   `'Type:'`)
  - SP = first character <u>following</u> pattern

Find Match Point

- If no more patterns in the template
  - MP = end of data + 1
- If another pattern in the template
  - If part of remaining data matches pattern
    - MP = char position of <u>start</u> of next pattern
  - If no remaining data matches the pattern
    - MP = end of data + 1

WordParse the Data

- Extract the data string from the StartPoint to, <u>but not including</u>, the MatchPoint

- WordParse this string into the variable(s) between the template patterns

Literal Patterns (1)>

```
          ....|....1....|....2....|....3....|....4
    str> " We have  met the enemy, and  he is us. "
          S                       M
 *-* Parse Var str v1 v2 v3 ',' v4 v5
    v1 > __________________________________________
    v2 > __________________________________________
    v3 > __________________________________________
    v4 > __________________________________________
    v5 > __________________________________________
```

Literal Patterns (1)>

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
        S                      M
*-* Parse Var str v1 v2 v3 ',' v4 v5
  v1 > "We"
  v2 >
  v3 >
  v4 >
  v5 >
```

Literal Patterns (1)>

```
         ....|....1....|....2....|....3....|....4
      str> " We have  met the enemy, and  he is us. "
         S                       M
    *-* Parse Var str v1 v2 v3 ',' v4 v5
      v1 > "We"
      v2 > "have"
      v3 >
      v4 >
      v5 >
```

Literal Patterns (1)>

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
        S                      M
*-* Parse Var str v1 v2 v3 ',' v4 v5
  v1 > "We"
  v2 > "have"
  v3 > " met the enemy"
  v4 >
  v5 >
```

Literal Patterns (1)>

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
                                S               M
*-* Parse Var str v1 v2 v3 ',' v4 v5
  v1 > "We"
  v2 > "have"
  v3 > " met the enemy"
  v4 >
  v5 >
```

Literal Patterns (1)>

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
                              S               M
*-* Parse Var str v1 v2 v3 ',' v4 v5
  v1 > "We"
  v2 > "have"
  v3 > " met the enemy"
  v4 > "and"
  v5 >
```

Literal Patterns (1)

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
                                S               M
*-* Parse Var str v1 v2 v3 ',' v4 v5
  v1 > "We"
  v2 > "have"
  v3 > " met the enemy"
  v4 > "and"
  v5 > " he is us. "
```

Variable Patterns (1)

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "

*-* dlim = ','
*-* Parse Var str v1 v2 v3 (dlim)v4 v5
  v1 > "We"
  v2 > "have"
  v3 > " met the enemy"
  v4 > "and"
  v5 > " he is us. "
```

Variable Patterns (2)

```
          ....|....1....|....2....|....3....|....4
      str> " We have  met the enemy, and  he is us. "

    *-* dlim = 24
    *-* Parse Var str v1 v2 v3 (dlim)v4 v5
      v1 > "We"
      v2 > "have"
      v3 > " met the enemy, and  he is us. "     !!!
      v4 > ""
      v5 > ""
```

Variable Patterns (3)

```
          ....|....1....|....2....|....3....|....4
      str> " We have  met the enemy, and  he is us. "

    *-* dlim = 24
    *-* Parse Var str v1 v2 v3 =(dlim) v4 v5
      v1 > "We"
      v2 > "have"
      v3 > " met the enemy"
      v4 > ","
      v5 > "and  he is us. "
```

Variable Patterns (4)

```
line.1 = 'Fannie Mae;1;19;2:55;'
line.2 = 'Midnight Special/2/23/2:54/'
line.3 = 'Wang Dang Doodle,2,10,2:59,'
line.4 = 'St. Louis Blues-1-10-3:02-'
Do i = 1 To 4
  lastchar = Length(line.i)
  Parse Var line.i =(lastchar) dlim ,
                   =1 title (dlim)  ,
                      cdnum (dlim)  ,
                      trk   (dlim)  ,
                      time  (dlim) .
  Say Left(title,20) Right(cdnum,2) ,
      Right(trk,3) Left(time,8)
End i
-------------------------------------------
Fannie Mae           1  19 2:55
Midnight Special     2  23 2:54
Wang Dang Doodle     2  10 2:59
St. Louis Blues      1  10 3:02
```

Find Start Point

- If beginning of template
  - SP = first character of data

- If literal pattern (`","`   `'Type:'`)
  - SP = first character <u>following</u> pattern ☆

☆ unless the MP is a relative position pattern, in which case SP = first character of pattern

Literal+Relative Patterns (1)>

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
        S                      M
*-* Parse Var str v1 v2 v3 ',' v4 +1 v5 v6
  v1 > __________________________________________
  v2 > __________________________________________
  v3 > __________________________________________
  v4 > __________________________________________
  v5 > __________________________________________
  v6 > __________________________________________
```

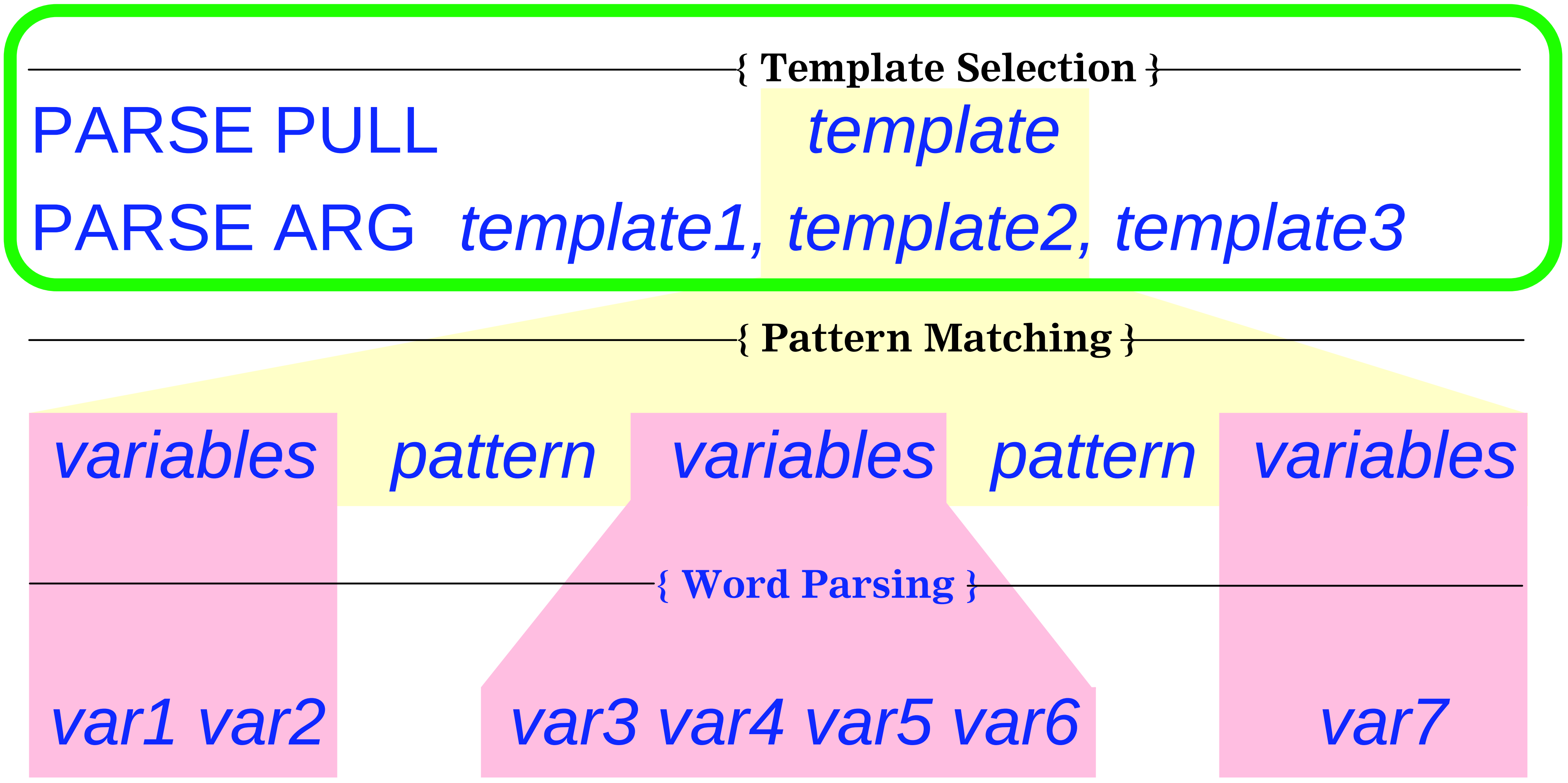
Literal+Relative Patterns (1)>

```
        ....|....1....|....2....|....3....|....4
    str> " We have  met the enemy, and  he is us. "
                                      SM
  *-* Parse Var str v1 v2 v3 ',' v4 +1 v5 v6
    v1 > "We"
    v2 > "have"
    v3 > " met the enemy"
    v4 > ____________________________________________
    v5 > ____________________________________________
    v6 > ____________________________________________
```

Literal+Relative Patterns (1)

```
        ....|....1....|....2....|....3....|....4
  str> " We have  met the enemy, and  he is us. "
                                S               M
*-* Parse Var str v1 v2 v3 ',' v4 +1 v5 v6
  v1 > "We"
  v2 > "have"
  v3 > " met the enemy"
  v4 > ","
  v5 > "and"
  v6 > " he is us. "
```

Parsing Hierarchy



Argument Strings

- Only one data string parsed at a time
- **Exception -**PARSE ARG :
  - Each argument is a separate string
  - Argument data strings separated by commas
  - PARSE ARG templates separated by commas
  - Omitted arg same as null string

- OpSys passes only one argument string

Parse Arg (1)

```
*-* call r1 'A Practical', 'Approach', 'to Programming'
*-*    ...
*-* r1: parse arg arg1, arg2, arg3
  arg1 > "A Practical"
  arg2 > "Approach"
  arg3 > "to Programming"


*-* call r1 'A Practical Approach',, 'to Programming'
*-*    ...
*-* r1: parse arg v1 v2 . v3, v4 v5 . , . v6
  v1   > "A"
  v2   > "Practical"
  v3   > ""
  v4   > ""
  v5   > ""
  v6   > "Programming"
```

Parse Arg (2)

```
*-* call r2 'A Practical Approach',, 'to Programming'
*-*    ...
*-* r2: parse arg v1 'Pr' v2 v3 +99, . , =7 v4 +4 . v5
  v1 > "A "
  v2 > "Practical"
  v3 > "Approach"
  v4 > "gram"
  v5 > ""

*-* call r3 'A Practical Approach',, 'to Programming'
*-*   ...
*-* r3: parse arg ,,v4 v5 v6
  v4 > "to"
  v5 > "Programming"
  v6 > ""
```

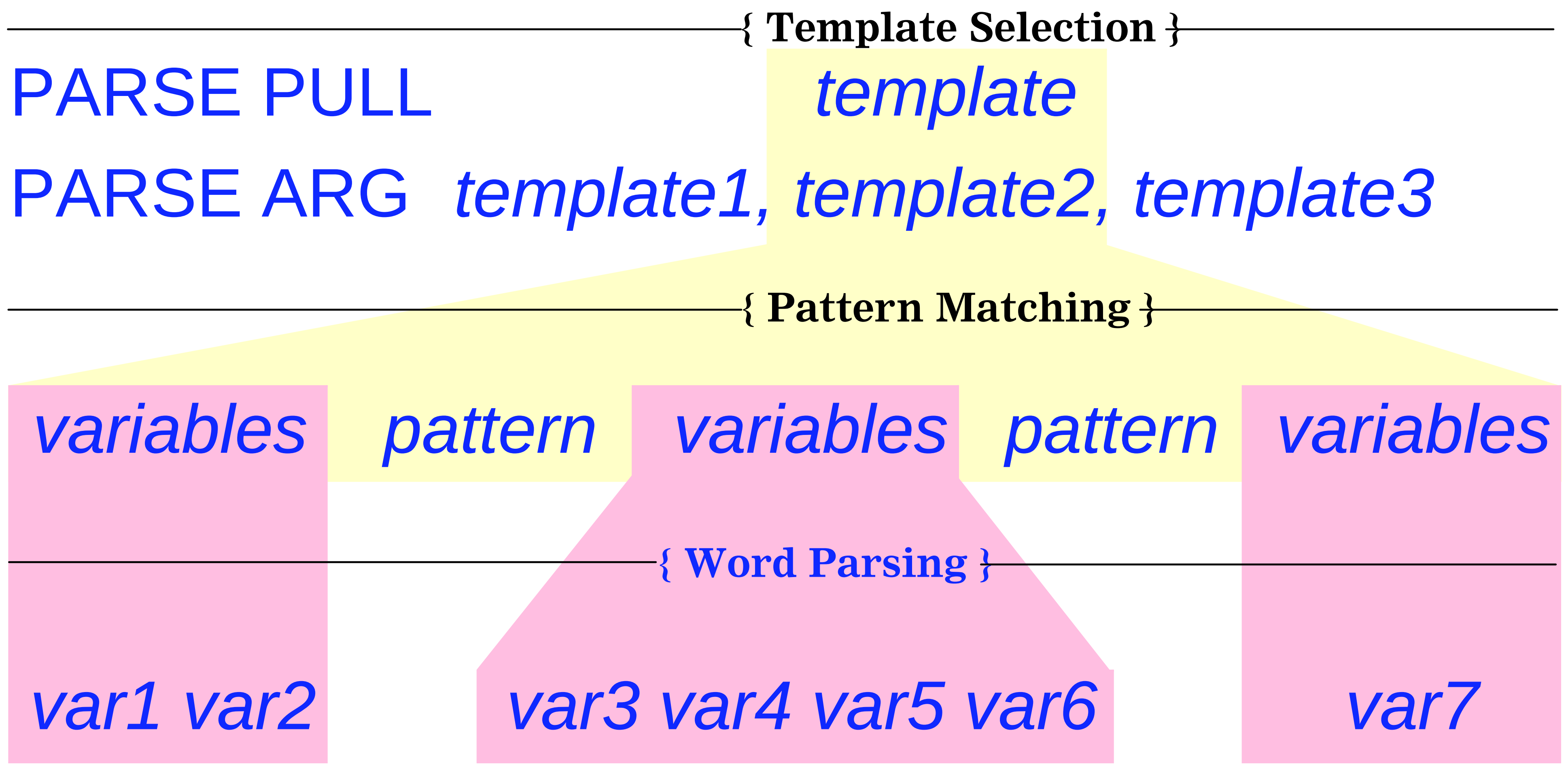
So In Summary …

Instruction Format - Template

PARSE [UPPER] *source* *template*

- *template*
  - data variables `rec2 rlen food bard`
  - placeholder periods `.`
  - explicit patterns
    - absolute position `12 =42`
    - relative position `+8 -4`
    - literal `'/' "total=" '09'x`
  - variable reference patterns `(delim)(pattrn3)`

Parsing Hierarchy



Find Start Point

- If beginning of template
  - SP = first character of data
- If previous absolute position pattern (**8 =42**)
  - SP = pattern as a character position
- If previous relative position pattern (**+57 -2**)
  - SP = previous MP + pattern as char position
- If previous literal pattern (**"," 'Type:'**)
  - SP = first character <u>following</u> pattern

[illegible]

Find Match Point

- If no more patterns in the template
  - MP = end of data + 1
- If another pattern in the template
  - If part of remaining data matches pattern
    - MP = char position of <u>start</u> of next pattern
  - If no remaining data matches the template
    - MP = end of data + 1
- If MP <= SP (not moving forward in the data)
    - MP = end of data + 1

Word Parsing

- Each variable in template is assigned a word of the data string
  - All leading blanks are removed
  - One trailing blank is removed
  - **Exception -** last variable in template:
    - No blanks are removed
    - Rest of data string assigned to last variable
- If no data, null string is assigned to variable
- Placeholder periods ignore data word
- Every variable <u>will</u> get a new value

Conclusion

- Rexx Parse Templates are:
  - Very Powerful
  - Easy to Use (now that you understand them!)
  - Flexible
  - Efficient
  - Consistent
  - Human-oriented