



BURSA TEKNİK ÜNİVERSİTESİ

Bursa Teknik Üniversitesi
Bilgisayar Mühendisliği

BLM0238 Programlama Dilleri

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Bölüm: Bilgisayar Mühendisliği

Proje konusu: Real-Time Grammar-Based Syntax Highlighter with GUI

Documentation for Real-Time Grammar-Based Syntax Highlighter with GUI project

1. Language and Grammar Choice

- Language: Python-like syntax (simplified for demonstration).

Grammar Rules:

expression \rightarrow term (OPERATOR term)*

term \rightarrow NUMBER | IDENTIFIER | '('

expression ')'

- Justification:

Covers arithmetic/logical expressions.

Extensible for statements (e.g., if, for).

2. Lexical Analysis Details

- Approach: Regular expression-based scanner.

- Token Types:

```
token_specs = [  
    ('NUMBER', r'\d+(\.\d+)?'),  
    ('OPERATOR', r'[+ \- * / = < > ! & | ^ %]'),  
    # ... (other tokens)  
]
```

- Key Features:

1. Position tracking for error reporting.
2. Fallback UNKNOWN token for unclassified characters.

3.Syntax Analysis Process

- Algorithm: Recursive descent parsing.
- Steps:
 1. Tokenize input.
 2. Validate structure via `parse_expression()` and `parse_term()`.
 3. Report mismatched parentheses or operators.

Error Handling: Raises exceptions on invalid syntax.

4.Parsing Methodology

- Type: Top-down, predictive.
- Functions:
 1. `parse_expression()`: Handles operator chaining.
 2. `parse_term()`: Validates literals/variables/parentheses.

Limitations: No operator precedence or statement support.

5.Highlighting Scheme

- Color Map:

```
{  
'KEYWORD': '#569CD6', # Blue  
'STRING': '#CE9178', # Orange  
'COMMENT': '#6A9955', # Green  
# ... (other colors) }
```

- Implementation:
 1. Tkinter text tags applied on keystroke.
 2. Full re-scanning for simplicity.

6.GUI Implementation

- Framework: Tkinter.
- Components:
 1. ScrolledText widget for code editing.
 2. Event binding (<KeyRelease>) for real-time updates.
- Features:
 1. Dynamic syntax highlighting.
 2. Basic error indication (red background).