

## REPORT:

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## ANALYZING PATIENT VITALS CODE WITH JAVA PARSER IN VSCODE (MAVEN)

### INTRODUCTION

This report details the analysis of Java code, representing a PatientVitals class, using the Java Parser library within the VSCode IDE. The analysis leverages the Maven build tool for project management.

#### *Analysis Approach*

The Java Parser library is a tool for parsing Java source code into an Abstract Syntax Tree (AST). This AST represents the structure of the code, allowing programmatic access to its elements (classes, methods, variables, etc.). This analysis likely involved:

**Dependency inclusion:** The project has included the javaparser-core dependency in its pom.xml file for Maven to manage the Java Parser library.

**Code Parsing:** The Java code (PatientVitals.java), is parsed using the Java Parser library. This generates an AST representing the code's structure.

**AST Traversal:** Code is written to traverse the AST, extracting relevant information like class definitions, methods, and fields.

**Tokenization:** The code tokenizes the source code, breaking it down into smaller elements like keywords, identifiers, operators, and literals. This allows counting the total number of tokens and categorizing them by type.

**Output Generation:** The analysis results were then presented and displayed within the VSCode console and written to a separate report file.

### Expected Analysis Results

The analysis generated the following outputs:

1. Abstract Syntax Tree (AST):

The AST was generated and the class definitions were made, the fields (e.g., name, bloodPressureSystolic), methods (e.g., getBloodPressureString), and their relationships within the code.

2. Total Number of Tokens:

This represents the total count of all individual elements (keywords, identifiers, etc.) identified within the source code.

3. Token Types and Counts:

The analysis categorized and counted the different types of tokens found in the code. This includes:

- Keywords (e.g., public, class, if)
- Identifiers (e.g., variable names, method names)
- Operators (e.g., +, -, \*)
- Literals (e.g., string literals, numeric literals)
- Other token types (e.g., separators, comments)

### ***Benefits of this Analysis***

We understood code structure through the AST visualization and Tokenization helped us analyze code complexity and identify potential areas for improvement or optimization.

### ***Limitations***

The report cannot access the actual content of the code beyond the analysis results.

### ***Conclusion***

This analysis demonstrates how the Java Parser library, integrated with VSCode and Maven, can be used to explore and understand Java code structure. By examining the AST and tokenization results, developers gain valuable insights into the code's complexity and organization.

### ***Here is the output;***

```
PS C:\Users\USER\Documents\demo> c.; cd 'c:\Users\USER\Documents\demo'; & 'C:\Program
Files\Java\jdk-21\bin\java.exe'
'@C:\Users\USER\AppData\Local\Temp\cp_56txxfoc7g3b59h11e32ai01v.argfile'
'com.example.Javaparser_Main'
```

Token Counts:

EOL: 95

OPERATOR: 24

LITERAL: 16

SEPARATOR: 153

KEYWORD: 75

IDENTIFIER: 102

WHITESPACE\_NO\_EOL: 566

COMMENT: 8

Total Tokens: 1039

The AST is below:

CompilationUnit: package com.example;

class PatientVitals {

...

└─ PackageDeclaration: package com.example;

...

| └─ Name: com.example...

| | └─ Name: com...

└─ ClassOrInterfaceDeclaration: class PatientVitals {

// Fields to store pa...

| └─ SimpleName: PatientVitals...

| └─ FieldDeclaration: // Fields to store patient information

private St...

| | └─ Modifier: private ...

| | └─ VariableDeclarator: name...

| | | └─ ClassOrInterfaceType: String...

```

| | | | └─ SimpleName: String...
| | | └─ SimpleName: name...
| └─ FieldDeclaration: private double bloodPressureSystolic;...
| | └─ Modifier: private ...
| | └─ VariableDeclarator: bloodPressureSystolic...
| | | └─ PrimitiveType: double...
| | | └─ SimpleName: bloodPressureSystolic...
| └─ FieldDeclaration: private double bloodPressureDiastolic;...
| | └─ Modifier: private ...
| | └─ VariableDeclarator: bloodPressureDiastolic...
| | | └─ PrimitiveType: double...
| | | └─ SimpleName: bloodPressureDiastolic...
| └─ FieldDeclaration: private double temperature;...
| | └─ Modifier: private ...
| | └─ VariableDeclarator: temperature...
| | | └─ PrimitiveType: double...
| | | └─ SimpleName: temperature...
| └─ FieldDeclaration: private int pulseRate;...
| | └─ Modifier: private ...
| | └─ VariableDeclarator: pulseRate...
| | | └─ PrimitiveType: int...
| | | └─ SimpleName: pulseRate...
| └─ FieldDeclaration: private int respirationRate;...
| | └─ Modifier: private ...
| | └─ VariableDeclarator: respirationRate...
| | | └─ PrimitiveType: int...
| | | └─ SimpleName: respirationRate...
| └─ ConstructorDeclaration: // Constructor to initialize patient vitals

```

publi...

- | | └─ Modifier: public ...
- | | └─ SimpleName: PatientVitals...
- | | └─ Parameter: String name...
- | | | └─ ClassOrInterfaceType: String...
- | | | | └─ SimpleName: String...
- | | | └─ SimpleName: name...
- | | └─ Parameter: double bloodPressureSystolic...
- | | | └─ PrimitiveType: double...
- | | | └─ SimpleName: bloodPressureSystolic...
- | | └─ Parameter: double bloodPressureDiastolic...
- | | | └─ PrimitiveType: double...
- | | | └─ SimpleName: bloodPressureDiastolic...
- | | └─ Parameter: double temperature...
- | | | └─ PrimitiveType: double...
- | | | └─ SimpleName: temperature...
- | | └─ Parameter: int pulseRate...
- | | | └─ PrimitiveType: int...
- | | | └─ SimpleName: pulseRate...
- | | └─ Parameter: int respirationRate...
- | | | └─ PrimitiveType: int...
- | | | └─ SimpleName: respirationRate...
- | | └─ BlockStmt: {  
this.name = name;  
this.bloodPressureSy...
  - | | | └─ ExpressionStmt: this.name = name;...
  - | | | | └─ AssignExpr: this.name = name...
  - | | | | | └─ FieldAccessExpr: this.name...

| | | | | |  $\vdash$  ThisExpr: this...  
 | | | | | |  $\vdash$  SimpleName: name...  
 | | | | |  $\vdash$  NameExpr: name...  
 | | | | | |  $\vdash$  SimpleName: name...  
 | | |  $\vdash$  ExpressionStmt: this.bloodPressureSystolic = bloodPressureSystolic...  
 | | | |  $\vdash$  AssignExpr: this.bloodPressureSystolic = bloodPressureSystolic...  
 | | | | |  $\vdash$  FieldAccessExpr: this.bloodPressureSystolic...  
 | | | | | |  $\vdash$  ThisExpr: this...  
 | | | | | |  $\vdash$  SimpleName: bloodPressureSystolic...  
 | | | | |  $\vdash$  NameExpr: bloodPressureSystolic...  
 | | | | | |  $\vdash$  SimpleName: bloodPressureSystolic...  
 | | |  $\vdash$  ExpressionStmt: this.bloodPressureDiastolic = bloodPressureDiastol...  
 | | | |  $\vdash$  AssignExpr: this.bloodPressureDiastolic = bloodPressureDiastol...  
 | | | | |  $\vdash$  FieldAccessExpr: this.bloodPressureDiastolic...  
 | | | | | |  $\vdash$  ThisExpr: this...  
 | | | | | |  $\vdash$  SimpleName: bloodPressureDiastolic...  
 | | | | |  $\vdash$  NameExpr: bloodPressureDiastolic...  
 | | | | | |  $\vdash$  SimpleName: bloodPressureDiastolic...  
 | | |  $\vdash$  ExpressionStmt: this.temperature = temperature;...  
 | | | |  $\vdash$  AssignExpr: this.temperature = temperature...  
 | | | | |  $\vdash$  FieldAccessExpr: this.temperature...  
 | | | | | |  $\vdash$  ThisExpr: this...  
 | | | | | |  $\vdash$  SimpleName: temperature...  
 | | | | |  $\vdash$  NameExpr: temperature...  
 | | | | | |  $\vdash$  SimpleName: temperature...  
 | | |  $\vdash$  ExpressionStmt: this.pulseRate = pulseRate;...  
 | | | |  $\vdash$  AssignExpr: this.pulseRate = pulseRate...  
 | | | | |  $\vdash$  FieldAccessExpr: this.pulseRate...

```

| | | | | | | └─ ThisExpr: this...
| | | | | | | └─ SimpleName: pulseRate...
| | | | | | └─ NameExpr: pulseRate...
| | | | | | | └─ SimpleName: pulseRate...
| | | | └─ ExpressionStmt: this.respirationRate = respirationRate;...
| | | | └─ AssignExpr: this.respirationRate = respirationRate...
| | | | | └─ FieldAccessExpr: this.respirationRate...
| | | | | | └─ ThisExpr: this...
| | | | | | └─ SimpleName: respirationRate...
| | | | | | └─ NameExpr: respirationRate...
| | | | | | └─ SimpleName: respirationRate...
| └─ MethodDeclaration: // Getter and setter methods for accessing and mod...
| | └─ Modifier: public ...
| | └─ SimpleName: getName...
| | └─ ClassOrInterfaceType: String...
| | | └─ SimpleName: String...
| | └─ BlockStmt: {
| |     return name;
| | }...
| | | └─ ReturnStmt: return name;...
| | | | └─ NameExpr: name...
| | | | | └─ SimpleName: name...
| └─ MethodDeclaration: public void setName(String name) {
|     this.name ...
| | └─ Modifier: public ...
| | └─ SimpleName: setName...
| | └─ Parameter: String name...
| | | └─ ClassOrInterfaceType: String...

```

```

| | | | └─ SimpleName: String...
| | | └─ SimpleName: name...
| | └─ VoidType: void...
| | └─ BlockStmt: {
    this.name = name;
}...

| | | └─ ExpressionStmt: this.name = name;...
| | | | └─ AssignExpr: this.name = name...
| | | | | └─ FieldAccessExpr: this.name...
| | | | | | └─ ThisExpr: this...
| | | | | | └─ SimpleName: name...
| | | | | └─ NameExpr: name...
| | | | | └─ SimpleName: name...
| └─ MethodDeclaration: public double getBloodPressureSystolic() {
    re...

| | └─ Modifier: public ...
| | └─ SimpleName: getBloodPressureSystolic...
| | └─ PrimitiveType: double...
| | └─ BlockStmt: {
    return bloodPressureSystolic;
}...

| | | └─ ReturnStmt: return bloodPressureSystolic;...
| | | | └─ NameExpr: bloodPressureSystolic...
| | | | | └─ SimpleName: bloodPressureSystolic...
| └─ MethodDeclaration: public void setBloodPressureSystolic(double bloodP...
| | └─ Modifier: public ...
| | └─ SimpleName: setBloodPressureSystolic...
| | └─ Parameter: double bloodPressureSystolic...

```



```

| | | └─ PrimitiveType: double...
| | | └─ SimpleName: bloodPressureSystolic...
| | └─ VoidType: void...
| | └─ BlockStmt: {
    this.bloodPressureSystolic = bloodPressureS...
| | | └─ ExpressionStmt: this.bloodPressureSystolic = bloodPressureSystolic...
| | | | └─ AssignExpr: this.bloodPressureSystolic = bloodPressureSystolic...
| | | | | └─ FieldAccessExpr: this.bloodPressureSystolic...
| | | | | | └─ ThisExpr: this...
| | | | | | └─ SimpleName: bloodPressureSystolic...
| | | | | └─ NameExpr: bloodPressureSystolic...
| | | | └─ SimpleName: bloodPressureSystolic...
| └─ MethodDeclaration: public double getBloodPressureDiastolic() {
    r...
| | └─ Modifier: public ...
| | └─ SimpleName: getBloodPressureDiastolic...
| | └─ PrimitiveType: double...
| | └─ BlockStmt: {
    return bloodPressureDiastolic;
}...
| | | └─ ReturnStmt: return bloodPressureDiastolic;...
| | | | └─ NameExpr: bloodPressureDiastolic...
| | | | | └─ SimpleName: bloodPressureDiastolic...
| └─ MethodDeclaration: public void setBloodPressureDiastolic(double blood...
| | └─ Modifier: public ...
| | └─ SimpleName: setBloodPressureDiastolic...
| | └─ Parameter: double bloodPressureDiastolic...
| | | └─ PrimitiveType: double...

```

```

| | | ⊢ SimpleName: bloodPressureDiastolic...
| | ⊢ VoidType: void...
| | ⊢ BlockStmt: {
    this.bloodPressureDiastolic = bloodPressure...
| | | ⊢ ExpressionStmt: this.bloodPressureDiastolic = bloodPressureDiastol...
| | | | ⊢ AssignExpr: this.bloodPressureDiastolic = bloodPressureDiastol...
| | | | | ⊢ FieldAccessExpr: this.bloodPressureDiastolic...
| | | | | | ⊢ ThisExpr: this...
| | | | | | ⊢ SimpleName: bloodPressureDiastolic...
| | | | | ⊢ NameExpr: bloodPressureDiastolic...
| | | | | ⊢ SimpleName: bloodPressureDiastolic...
| ⊢ MethodDeclaration: public double getTemperature() {
    return tempe...
| | ⊢ Modifier: public ...
| | ⊢ SimpleName: getTemperature...
| | ⊢ PrimitiveType: double...
| | ⊢ BlockStmt: {
    return temperature;
}...
| | | ⊢ ReturnStmt: return temperature;...
| | | | ⊢ NameExpr: temperature...
| | | | | ⊢ SimpleName: temperature...
| ⊢ MethodDeclaration: public void setTemperature(double temperature) {
...
| | ⊢ Modifier: public ...
| | ⊢ SimpleName: setTemperature...
| | ⊢ Parameter: double temperature...
| | | ⊢ PrimitiveType: double...

```

```

| | | ⊢ SimpleName: temperature...
| | ⊢ VoidType: void...
| | ⊢ BlockStmt: {
    this.temperature = temperature;
}...
| | | ⊢ ExpressionStmt: this.temperature = temperature;...
| | | | ⊢ AssignExpr: this.temperature = temperature...
| | | | | ⊢ FieldAccessExpr: this.temperature...
| | | | | | ⊢ ThisExpr: this...
| | | | | | ⊢ SimpleName: temperature...
| | | | | ⊢ NameExpr: temperature...
| | | | | | ⊢ SimpleName: temperature...
| | ⊢ MethodDeclaration: public int getPulseRate() {
    return pulseRate;...
}...
| | ⊢ Modifier: public ...
| | ⊢ SimpleName: getPulseRate...
| | ⊢ PrimitiveType: int...
| | ⊢ BlockStmt: {
    return pulseRate;
}...
| | | ⊢ ReturnStmt: return pulseRate;...
| | | | ⊢ NameExpr: pulseRate...
| | | | | ⊢ SimpleName: pulseRate...
| | ⊢ MethodDeclaration: public void setPulseRate(int pulseRate) {
    thi...
| | ⊢ Modifier: public ...
| | ⊢ SimpleName: setPulseRate...
| | ⊢ Parameter: int pulseRate...

```

```

| | | ⊢ PrimitiveType: int...
| | | ⊢ SimpleName: pulseRate...
| | ⊢ VoidType: void...
| | ⊢ BlockStmt: {
  this.pulseRate = pulseRate;
}...
| | | ⊢ ExpressionStmt: this.pulseRate = pulseRate;...
| | | | ⊢ AssignExpr: this.pulseRate = pulseRate...
| | | | | ⊢ FieldAccessExpr: this.pulseRate...
| | | | | | ⊢ ThisExpr: this...
| | | | | | ⊢ SimpleName: pulseRate...
| | | | | ⊢ NameExpr: pulseRate...
| | | | | | ⊢ SimpleName: pulseRate...
| | ⊢ MethodDeclaration: public int getRespirationRate() {
  return resp...
}...
| | ⊢ Modifier: public ...
| | ⊢ SimpleName: getRespirationRate...
| | ⊢ PrimitiveType: int...
| | ⊢ BlockStmt: {
  return respirationRate;
}...
| | | ⊢ ReturnStmt: return respirationRate;...
| | | | ⊢ NameExpr: respirationRate...
| | | | | ⊢ SimpleName: respirationRate...
| | ⊢ MethodDeclaration: public void setRespirationRate(int respirationRate...
| | ⊢ Modifier: public ...
| | ⊢ SimpleName: setRespirationRate...
| | ⊢ Parameter: int respirationRate...

```

```

| | | ⊢ PrimitiveType: int...
| | | ⊢ SimpleName: respirationRate...
| | ⊢ VoidType: void...
| | ⊢ BlockStmt: {
    this.respirationRate = respirationRate;
}...
| | | ⊢ ExpressionStmt: this.respirationRate = respirationRate;...
| | | | ⊢ AssignExpr: this.respirationRate = respirationRate...
| | | | | ⊢ FieldAccessExpr: this.respirationRate...
| | | | | | ⊢ ThisExpr: this...
| | | | | | ⊢ SimpleName: respirationRate...
| | | | | | ⊢ NameExpr: respirationRate...
| | | | | | ⊢ SimpleName: respirationRate...
| | ⊢ MethodDeclaration: // Method to format blood pressure as a string
pu...
| | ⊢ Modifier: public ...
| | ⊢ SimpleName: getBloodPressureString...
| | ⊢ ClassOrInterfaceType: String...
| | | ⊢ SimpleName: String...
| | ⊢ BlockStmt: {
    return bloodPressureSystolic + "/" + bloodP...
| | | ⊢ ReturnStmt: return bloodPressureSystolic + "/" + bloodPressure...
| | | | ⊢ BinaryExpr: bloodPressureSystolic + "/" + bloodPressureDiastol...
| | | | | ⊢ BinaryExpr: bloodPressureSystolic + "/" + bloodPressureDiastol...
| | | | | | ⊢ BinaryExpr: bloodPressureSystolic + "/"...
| | | | | | | ⊢ NameExpr: bloodPressureSystolic...
| | | | | | | | ⊢ SimpleName: bloodPressureSystolic...
| | | | | | | | ⊢ StringLiteralExpr: "/"...

```

```
| | | | | | | └─ NameExpr: bloodPressureDiastolic...
| | | | | | | └─ SimpleName: bloodPressureDiastolic...
| | | | | └─ StringLiteralExpr: " mmHg"...
| └─ MethodDeclaration: // Method to print patient vitals
```

```
public void pri...
```

```

| | └─ Modifier: public ...
| | └─ SimpleName: printVitals...
| | └─ VoidType: void...
| | └─ BlockStmt: {
System.out.println("Patient Name: " + name)...
| | | └─ ExpressionStmt: System.out.println("Patient Name: " + name);...
| | | | └─ MethodCallExpr: System.out.println("Patient Name: " + name)...
| | | | | └─ FieldAccessExpr: System.out...
| | | | | | └─ NameExpr: System...
| | | | | | | └─ SimpleName: System...
| | | | | | | └─ SimpleName: out...
| | | | | | | └─ SimpleName: println...
| | | | | | | └─ BinaryExpr: "Patient Name: " + name...
| | | | | | | | └─ StringLiteralExpr: "Patient Name: "...
| | | | | | | | └─ NameExpr: name...
| | | | | | | | └─ SimpleName: name...
| | | └─ ExpressionStmt: System.out.println("Blood Pressure: " + getBloodPr...
| | | | └─ MethodCallExpr: System.out.println("Blood Pressure: " + getBloodPr...
| | | | | └─ FieldAccessExpr: System.out...
| | | | | | └─ NameExpr: System...
| | | | | | | └─ SimpleName: System...
| | | | | | | └─ SimpleName: out...
| | | | | | | └─ SimpleName: println...

```

```

| | | | | └─ BinaryExpr: "Blood Pressure: " + getBloodPressureString()...
| | | | | | └─ StringLiteralExpr: "Blood Pressure: "...
| | | | | | └─ MethodCallExpr: getBloodPressureString()...
| | | | | | | └─ SimpleName: getBloodPressureString...
| | | └─ ExpressionStmt: System.out.println("Temperature: " + temperature +...
| | | | └─ MethodCallExpr: System.out.println("Temperature: " + temperature +...
| | | | | └─ FieldAccessExpr: System.out...
| | | | | | └─ NameExpr: System...
| | | | | | | └─ SimpleName: System...
| | | | | | | └─ SimpleName: out...
| | | | | | └─ SimpleName: println...
| | | | | └─ BinaryExpr: "Temperature: " + temperature + " °C"...
| | | | | | └─ BinaryExpr: "Temperature: " + temperature...
| | | | | | | └─ StringLiteralExpr: "Temperature: "...
| | | | | | | └─ NameExpr: temperature...
| | | | | | | | └─ SimpleName: temperature...
| | | | | | └─ StringLiteralExpr: " °C"...
| | | └─ ExpressionStmt: System.out.println("Pulse Rate: " + pulseRate + " ...
| | | | └─ MethodCallExpr: System.out.println("Pulse Rate: " + pulseRate + " ...
| | | | | └─ FieldAccessExpr: System.out...
| | | | | | └─ NameExpr: System...
| | | | | | | └─ SimpleName: System...
| | | | | | | └─ SimpleName: out...
| | | | | | └─ SimpleName: println...
| | | | | └─ BinaryExpr: "Pulse Rate: " + pulseRate + " bpm"...
| | | | | | └─ BinaryExpr: "Pulse Rate: " + pulseRate...
| | | | | | | └─ StringLiteralExpr: "Pulse Rate: "...
| | | | | | | └─ NameExpr: pulseRate...

```





| | | | ⊢ ClassOrInterfaceType: String...

| | | | | ⊢ SimpleName: String...

| | | ⊢ SimpleName: args...

| | ⊢ VoidType: void...

| | ⊢ BlockStmt: {

// usage

PatientVitals patient = new P...

| | | ⊢ ExpressionStmt: // usage

PatientVitals patient = new PatientVital...

| | | | ⊢ VariableDeclarationExpr: PatientVitals patient = new PatientVitals("Lushomo...

| | | | | ⊢ VariableDeclarator: patient = new PatientVitals("Lushomo Kulungi", 120...

| | | | | | ⊢ ClassOrInterfaceType: PatientVitals...

| | | | | | | ⊢ SimpleName: PatientVitals...

| | | | | | | ⊢ SimpleName: patient...

| | | | | | | ⊢ ObjectCreationExpr: new PatientVitals("Lushomo Kulungi", 120.0, 80.0, ...

| | | | | | | | ⊢ ClassOrInterfaceType: PatientVitals...

| | | | | | | | | ⊢ SimpleName: PatientVitals...

| | | | | | | | | ⊢ StringLiteralExpr: "Lushomo Kulungi"...

| | | | | | | | | ⊢ DoubleLiteralExpr: 120.0...

| | | | | | | | | ⊢ DoubleLiteralExpr: 80.0...

| | | | | | | | | ⊢ DoubleLiteralExpr: 37.5...

| | | | | | | | | ⊢ IntegerLiteralExpr: 70...

| | | | | | | | | ⊢ IntegerLiteralExpr: 18...

| | | | ⊢ ExpressionStmt: patient.printVitals();...

| | | | | ⊢ MethodCallExpr: patient.printVitals()...

| | | | | | ⊢ NameExpr: patient...

| | | | | | | ⊢ SimpleName: patient...

| | | | | | | ⊢ SimpleName: printVitals...

```
PS C:\Users\USER\Documents\demo>
```