

Captain's Report

Team Size: 4 Members[Amr Ghazzali, Baghdad Jamai Ghali, Ihab Kassimi, Ayman ElAkkaoui]

Course: CSC 3315 – Languages and Compilers

Project: Parts 3 & 4 — Parser & Static Semantics Analyzer

Captain: Ayman ElAkkaoui

1. Team Overview

Our group consists of four members who worked together in developing the Parser and Static Semantics Analyzer parts of our language project. Each member developed many aspects of this project, from design and implementation to testing and documentation. Collaboration was ensured via regular meetings, shared repositories, and the task distribution managed by the team captain.

2. Project Objectives

The goal of this phase of the project was to:

1. Implement a Parser capable of verifying the syntactic correctness of programs written in our language and producing Concrete Syntax Trees (CSTs).
2. Implement a Static Semantics Analyzer to perform scope and identifier-use checks, build a Symbol Table, and convert CSTs into Abstract Syntax Trees (ASTs).
3. Integrate all components—Lexer, Parser, and Static Analyzer—into a consistent and functional pipeline.

3. Work Distribution

Ihab Kassimi– Grammar & Parser Structure

- Refined the grammar to ensure LL(1) compatibility.
- Designed and implemented the recursive descent parsing functions.
- Ensured correct error handling and CST node construction.

Baghdad Jamai Ghali – CST Generation & Parser Testing

- Implemented CST data structures.
- Developed test programs covering all productions.
- Built the production coverage table.

Amr Ghazzali – Static Semantics Analyzer & Symbol Table

- Designed and implemented the Symbol Table.
- Implemented defined-before-used checks.
- Contributed CST-to-AST transformation logic.

Ayman ElAkkaoui – AST Design, Integration, & Documentation

- Designed AST nodes.
- Helped implement CST-to-AST conversion.
- Documented system communication and formatting of CST/AST outputs.

4. Captain's Contributions

As team captain, I coordinated meetings, managed deadlines and ensured good integration across all parts of the project. I reviewed grammar changes together with my teammates because all of us need to agree on everything, I supported members facing technical challenges and they supported me as well and made sure the final deliverables follow the project guidelines.

5. Team Collaboration & Workflow

We worked together in the LAB to make sure everything worked, we faced some issues when we worked but we helped each other and even when we worked separately, we were always talking in a whatsapp group dedicated to the project.

6. Challenges & Resolutions

Combining Lexer, Parser, and Static Analyzer into a coherent and working pipeline was challenging we also faced issues in the grammar that required several refinement iterations Integration between lexer and parser required format alignment of tokens and designing a correct CST-to-AST mapping required careful planning but thankfully all issues were resolved collaboratively.

7. Project Status

Parser: Implemented fully and tested.

Static Semantics Analyzer: Carries out symbol table checks and builds ASTs.

All deliverables are complete and consistent with project requirements.

8. Conclusion

The team functioned well and delivered a comprehensive, working Parser and Static Semantics Analyzer. All members played a crucial role in maintaining the technical and documentation aspects of the deliverables.