

# Lab Assignment 11

**Course:** CS202 Software Tools and Techniques for CSE

**Lab Topic:** Analyzing C# Console Games for Bugs

**Date:** 3<sup>rd</sup> April 2025

## Objective

This lab introduces students to analyses of **C# Console games** using **Visual Studio**. The focus is on understanding the control flow using the Visual Studio Debugger and identifying bugs that cause the game to crash.

## Learning Outcomes

By the end of this lab, students will be able to:

- Analyze C# console game applications.
- Understand the benefit of the Visual Studio Debugger.
- Why/how/when bugs occur in games leading to crashes.

## Pre-Lab Requirements

- Operating System: Windows
- Software: Visual Studio 2022 (Community Edition), Visual Studio with .NET SDK
- Programming Language: C# (latest stable version)

## Lab Activities:

Select any **two** console games (<https://github.com/dotnet/dotnet-console-games>) written in C# and perform the following activities for each project (game):

- ❖ Visually illustrate<sup>1</sup> program execution in **Debug** mode by inserting **breakpoints** at appropriate places<sup>2</sup>.
- ❖ Your illustration should cover operations: **step-in, step-over, step-out**.
- ❖ Hunt<sup>3</sup> for **five** bugs..try hard!
- ❖ Fix the source code of the game, rebuild the project, and re-execute to check if the bug has been fixed.
- ❖ In your report, you must mention the bug context, i.e., (what, when, why, where) a bug occurred and how it was fixed. Include screenshots at appropriate places to support your explanation.

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<sup>1</sup>Screenshots are acceptable.

<sup>2</sup>If there is no `Main()` method in the program, where exactly is the entry point? Refer to the resources provided at the end of this document.

<sup>3</sup>This includes mutating (changing) arithmetic operators: + to -, \* to /, manipulating constants: 2 to 5. There is no restriction to the code location and the extent one can apply mutations. The aim of mutation is to inject bugs if none exists.

## Resources

- [Lecture 9 Slides](#)
- [Lecture 10 Slides](#)
- <https://github.com/dotnet/dotnet-console-games>
- <https://visualstudio.microsoft.com>
- <https://learn.microsoft.com/en-us/dotnet/csharp/fundamentals/program-structure/top-level-statements>
- <https://learn.microsoft.com/en-us/visualstudio/debugger>