GAME250: Technical Game Development (Spring 2023)

Lab 03

Mission Brief

1. In-Lab: Let the first player character win if they can figure out the exact number of times they are supposed to hit some particular boxes.

2. Lab: Create an in game calculator for simple addition and subtraction.

Objectives

By the end of this lab, you'll be able to:

- Use relational operations
- Use logical operations
- Convert between data types
- Use print strings

In-Lab Background

You will be making a math game where you reach a goal number by shooting boxes that carry out simple arithmetic operations.

In-Lab Instructions

Create a new project with Scalable 3D or 2D and With Starter Content.

Create an integer variable for the FirstPersonCharacter named Num Key. Set its default value to 1. This is the variable with which you try to reach the goal number.

You will be creating blueprints for five blue boxes and a SM_GlassWindow Prop:

- You can trigger different arithmetic operations by shooting different boxes:
  - Multiply by 2
  - Divide by 2
  - Set to 0
  - Add by 1 (increment)
  - Subtract by 1 (decrement)

The blueprint for the Add by 1 box is given below. Note the data conversion from Int to String using the ToString node. This is used to print the result of the arithmetic operation.
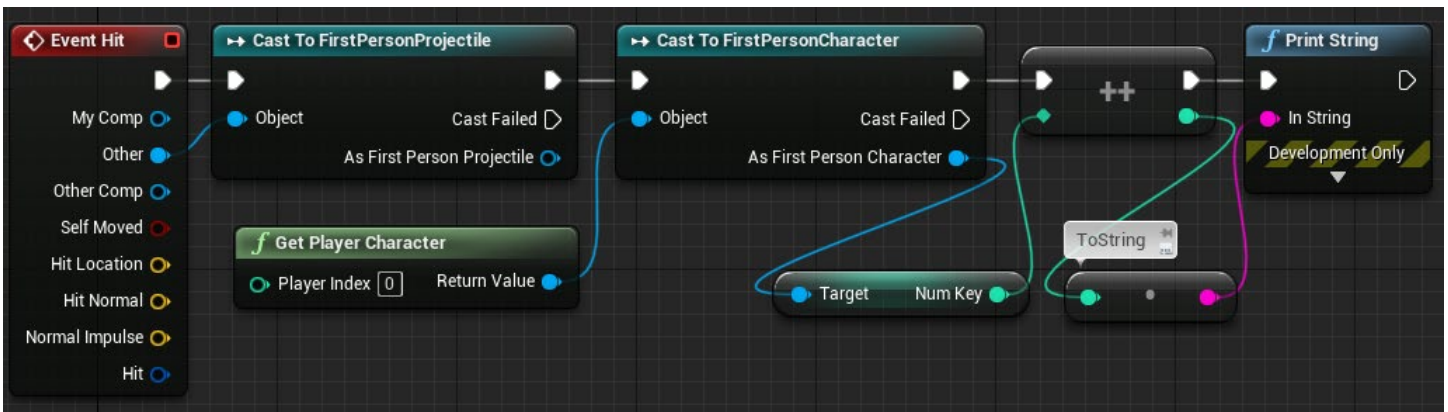
- The SM_GlassWindow blueprint has three functions:
  - Generate the goal number as an integer variable named Goal Number. The value will be randomly generated at the start of gameplay using the following:
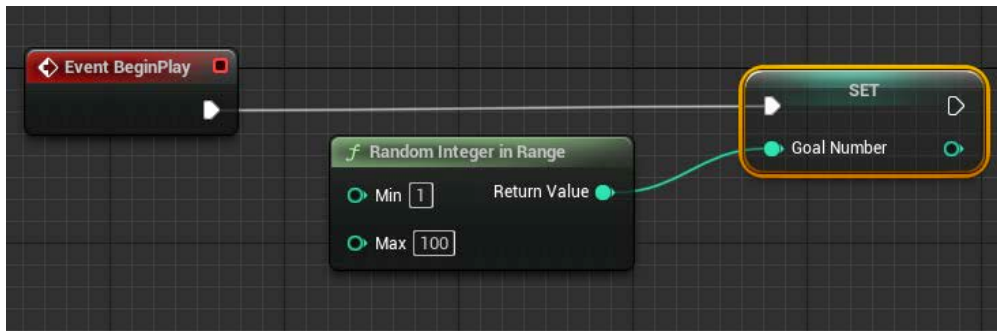
  - Print the goal number when it is shot. (As shown in 'Print String' at the top of the page.)
  - Win the game if the player walks into the door and the goal number has been reached

In-Lab Submission

Take screenshots of six blueprints, one for SM_GlassWindow and five for each blue box. Submit the screenshots to Canvas before the deadline.

Lab Background

You will be building a calculator that can do integer addition and subtraction (e.g. 5 + 3 = 8), building the arithmetic expression one operator and operand at a time.

Lab Instructions

Continue with the UE5 project from the In-Lab.

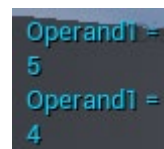Create the following variables for the FirstPersonCharacter:

- Operand1 of Integer data type (e.g. 5 in 5 + 3)
- Operator of String data type (e.g. +)
- Operand2 of Integer data type (e.g. 3 in 5 + 3)
- modifyOperand1 of Boolean data type (more info below)
- Result of Integer data type (e.g. 8 in 5 + 3 = 8)

You will be creating blueprints for three blue boxes and a SM_GlassWindow Prop:
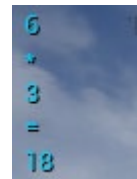
- Box 1: Add by 1 (increment)
- Box 2: Subtract by 1 (decrement)
- Box 3: Toggle Operator (between + and -)
- Box 4: Toggle Operand to modify (between Operand1 and Operand 2)
- SM_GlassWindow: Print operation result

The calculator works as follows. The player hits either Box 1 or Box 2 to increment or decrement Operator1. Once the desired value is reached, the player hits Box 3 to set the desired Operator (+ or -). Then when the player hits Box 1 or Box 2, Operand2 is now either incremented or decremented. The two boxes help you make the two numbers, Operand1 and Operand2. Finally the result can printed by hitting the SM_GlassWindow. The first two blueprints can be largely borrowed from the In-Lab; increment and decrement occur when the projectile hits the boxes. The game should know which one to adjust based on the toggle state from Box 4. The toggle state is stored with the FirstPersonCharacter as a boolean called modifyOperand1. If modifyOperand1 is false Operand2 is modified by Box 1 and Box 2.

Use Print String to indicate how each operand is changing:

When Box 3 is hit by the projectile, the operator should toggle between + and -.

When the Window is hit by the projectile, print the arithmetic expression and the result:

NOTE: Reverse the execution order of Print String nodes seem backward because the newest prints go on the top of the screen. The order in the blueprint should be:

- Result
- =
- Operand2
- Operator
- Operand1

HINT: You'll need an easy way to Get and Set FirstPersonCharacter's variables like Operand1, Operand2, Operator, and modifyOperand1. You can do that with the following nodes:
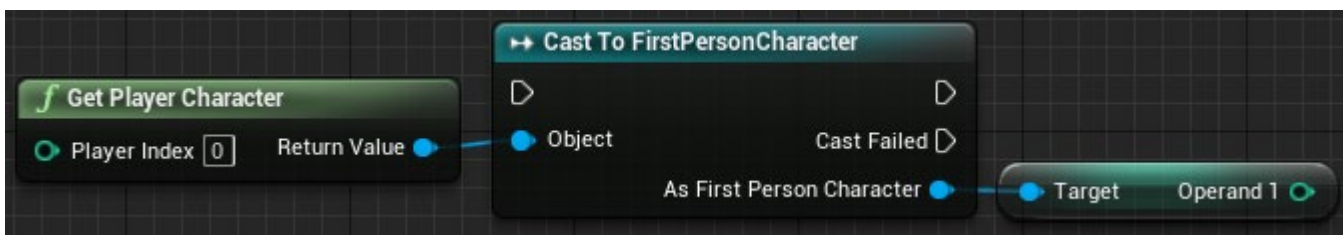
Lab Submission

Take a screenshot of the blueprint and submit it to Canvas before the deadline.