

---

# Assignment B2: Behavior Trees

---

Game Documentation

Intro to Computer Graphics  
*Rutgers University*

Prepared by:

Samuel Baysting  
David Arakelyan  
Frank Hoffman

# Contents

Game Details	2
Affordance Descriptions	3
Affordance Implementations	4
Custom Animations	5
Behavior Tree Structure	6
Bugs and Relevant Information	8

# Game Details

## Movement

This game uses the mouse to move and interact with the environment via Raycasting. You use LEFT-CLICK (ACTION button) to interact with the other NPCs and the objects in the environment. You use RIGHT-CLICK to move the player around the map.

## Objectives

Being the police officer in this game, you have three main objectives:

1. Rescue the hostages
2. Kill the criminals
3. Extinguish the fire

To do each of these things, you must be close enough to the object/NPC and click the ACTION button. To be able to extinguish the fire, you must first find the fire extinguisher and pick it up. The fire extinguisher spawns in random rooms throughout the house.

# Affordance Descriptions

## Cop and Criminal Interaction

Upon getting close to a criminal and pressing the ACTION button, the cop will perform a motion either pulling out his gun and shooting the criminal or kicking down the criminal. This is random every time. The criminal will then perform a dying motion.

## Cop and Hostage Interaction

Upon getting close to a hostage and pressing the ACTION button, the cop will perform a waving-type motion to hurry the hostage out of the room. The hostage will then run out of the room and out of the house.

## Cop and Outside Person Interaction

There is a person outside the house that is constantly waving at you. When you approach him and press the ACTION button, the cop will wave at the guy and it will open a dialog that gives you instructions of what to do. The outside guy is randomly performing three different affordances on a loop.

## Cop and Fire Extinguisher Interaction

When approaching the fire extinguisher, which spawns randomly in different rooms of the house, and pressing the ACTION button, the cop will bend over and pick up the fire extinguisher. It will then stay in his hand for the rest of the game.

## Cop and Fire Interaction

When the cop approaches the fire and presses the ACTION button, if the cop has the fire extinguisher, he will point the extinguisher at the fire and put it out. If he doesn't have the extinguisher, he will do nothing when clicking the fire. You will then have to go and find the extinguisher before putting out the fire.

## Affordance Implementations

To implement these affordances, we created our own behavior tree for each type of character. Each character behavior file is listed as follows:

1. CopBehaviorTree.cs
2. HostageBehaviorTree.cs
3. CriminalBehaviorTree.cs
4. OutsideDudeBehaviorTree.cs

In order to start/stop the animations, we added boolean values to the CharacterMechanim.cs to control who to interact with, what to do while interacting and, most importantly, when to interact.

## Custom Animations

We implemented three custom affordances that weren't in the KADAPT library:

1. Pointing extinguisher at the fire
2. Pulling the gun out
3. Picking up the object with the left hand

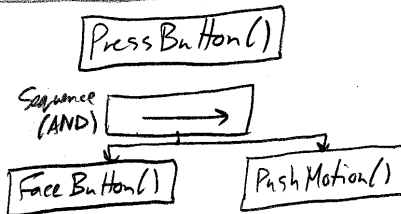
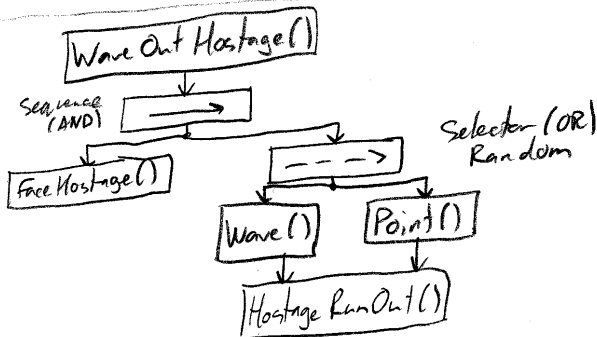
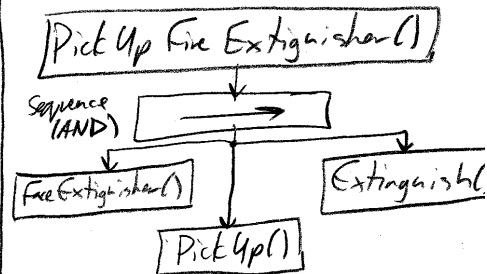
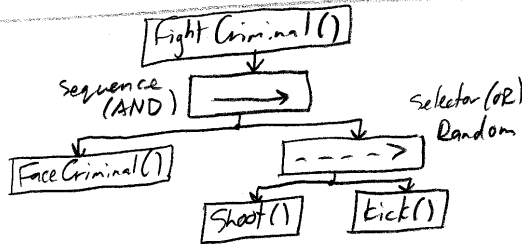
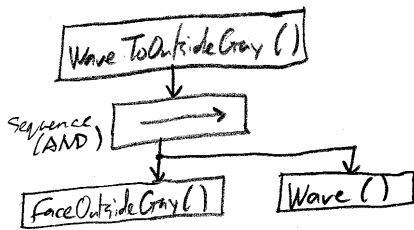
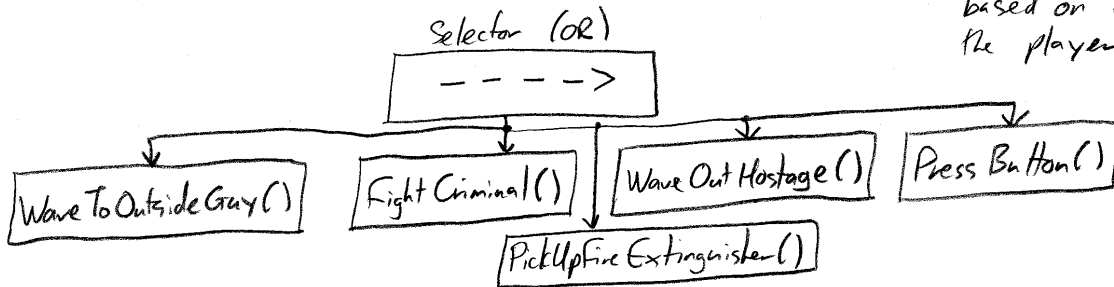
These can be found in the blog and within our implementation of our game.

## Behavior Tree Structure

The behavior tree structure for the cop can be found on the illustration in the next page. It includes some essence of randomness, as the project calls for.

# Cop Behavior Tree

Will execute behavior based on the person/object the player is interacting with



Random gestures within FightCriminal() and Wave Out Hostage()



## Bugs and Relevant Information

Our main issue was synchronization of animations. Our animations between characters and objects sometimes have massive delays for an unknown reason. It's probably to do with our implementation of the behaviors and how we activate them. It would be nice to have documentation on KADAPT, because there was none anywhere, making this project extremely difficult.