Teaching Interactive Computer Science

DD Sec. 5.1 – 5.4

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CRC Cards

MainWindow	
Keep track of menus and available menu options. Sends on commands given by the user.	DataStructures AnimationControl

DataStructures	
Send a structure. Keep track of available structures and functions. Check CurrentState if a structure is loaded. Create a Structure (with info from CurrentState)	Structure AnimationCreator CurrentState MainWindow

AnimationCreator	
Create an AnimationList from the information given by the structure sent.	Structure AnimationList AnimationController

AnimationList	
Keep track of each step of an algorithm Keep track of every updated state of the structure Keep a Structure	Structure

AnimationWindow	
Needs to update a certain number of frames per second. Draw each object given by the FrameList and on its right place.	FrameList MainWindow

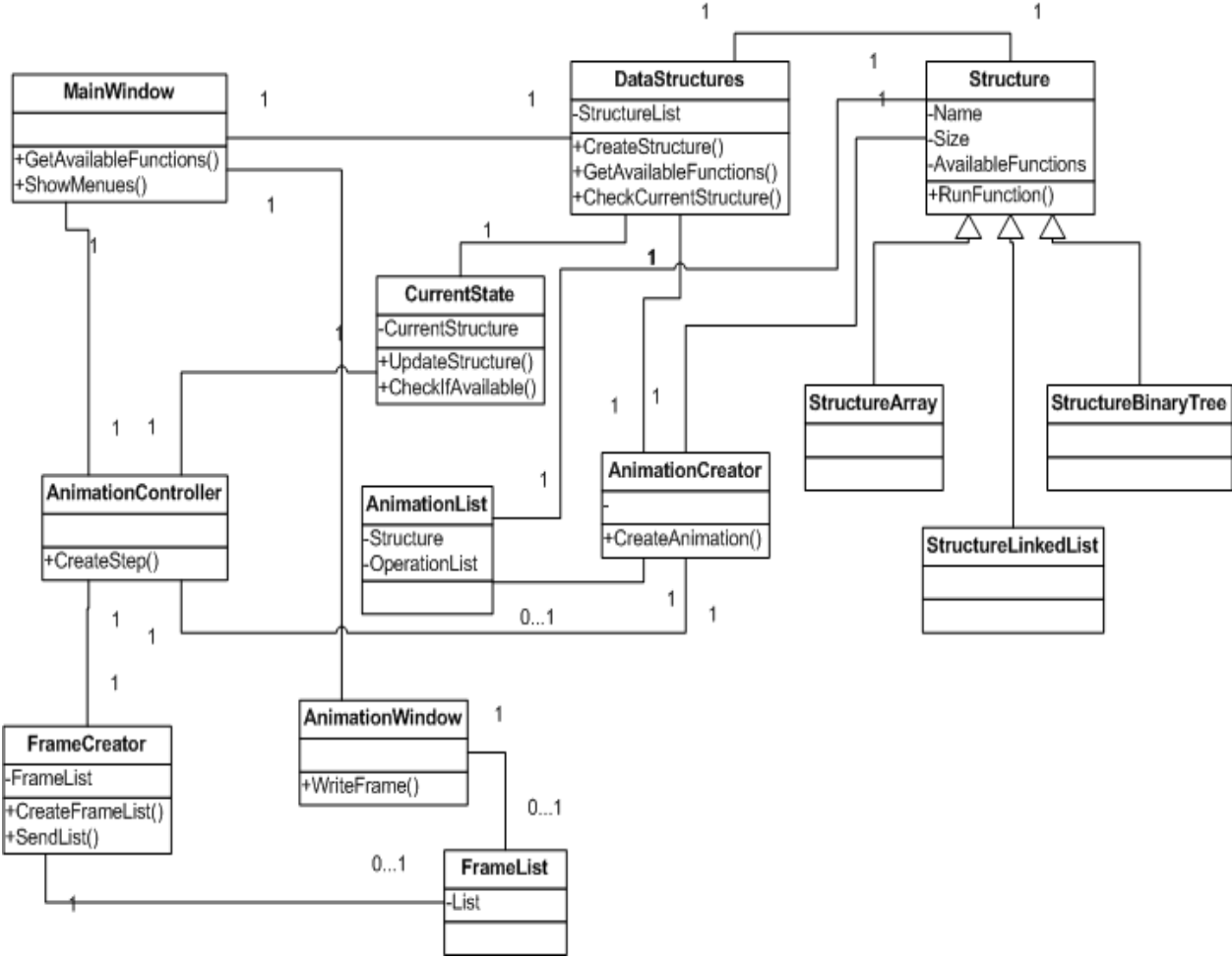| AnimationController	
Keep CurrentState up to date. Sends each animation step to the FrameCreator. Keep track of what buttons are clickable and sends that information to the main Window.	CurrentState MainWindow FrameCreator

Structure	
Knows name Knows size Knows available functions. Knows how the structure should be modeled. Knows what function to run.	None

FrameList	
Keeps a list of each "frame" that is needed for a operation on a datastructure. Each "frame" consists of coordinates and object types.	None

CurrentState	
Contains the currently loaded Structure.	DataStructure

FrameCreator	
Given an operation, create an animaion from it by creating a FrameList. Keep track of the structure and how objects move.	FrameList

Class diagram

State diagram

This state diagram describes how the animation system works.

The "No Structure loaded" state is the start state. It is the only state in which no animation or visualization is visible. As soon as a visualization is visible, the application will always show one until it is restarted.

If you run a function, then a new animation visualizing it will be created which is then displayed. This animation will be paused though, so we will remain in the same "Animation Paused" state. From the animation state machine's point of view, creating a structure is no different from running a function. It will receive an animation to play, which is paused.

Note that the animation will only pause between steps. With steps we mean that an object has appeared/disappeared completely, an arrow has reached is new destination, etc. It is not possible to pause the animation when it is half-through an action or step. Therefore, the animation state machine has a "Run until next step" which is run automatically until a complete step has been finished. After that, it goes to the paused state.
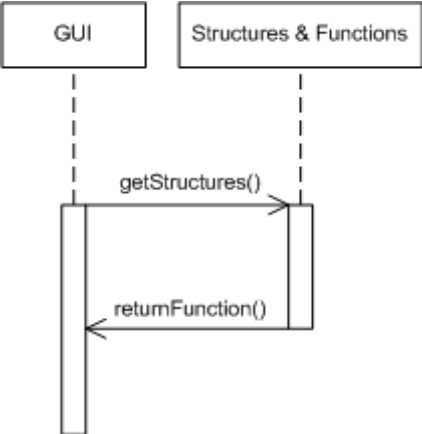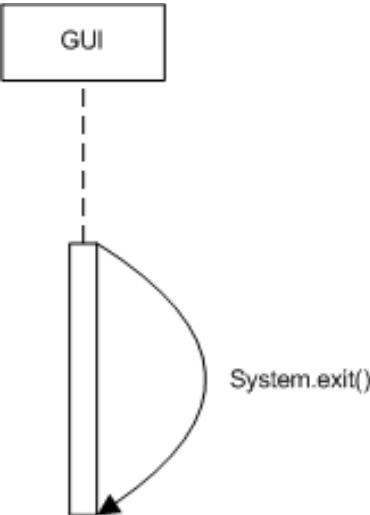
Interaction diagram

Starting the program

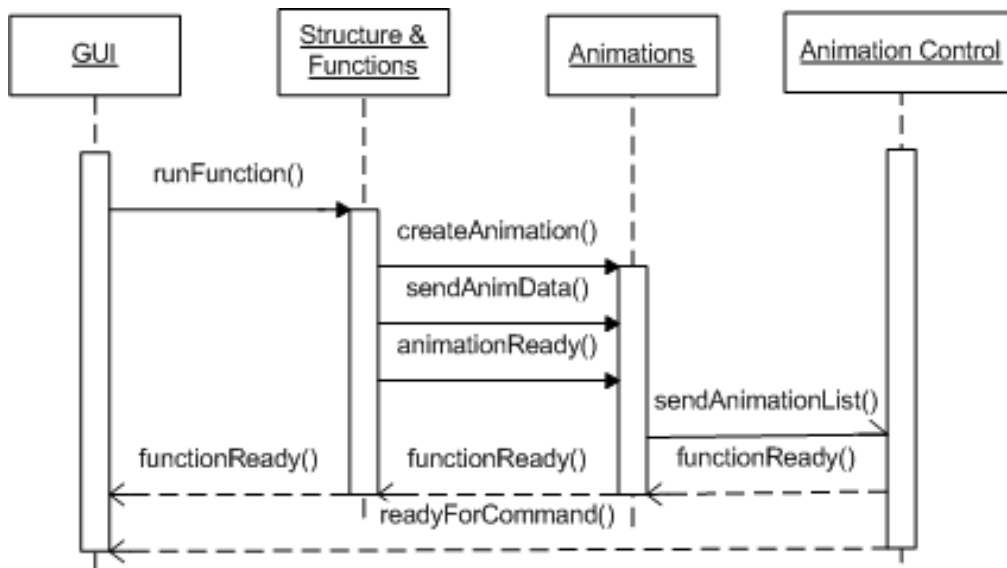This diagram represents how the modules communicate during the start of the program.

Quitting the program

This diagram represents how the modules communicate when the program closes.

Run a function

This is how the modules communicate when the user runs a function.

Run an animation

This is how the animation control module communicates with the GUI and Animation Window when showing an animation.