Teaching Interactive Computer Science

Group 7

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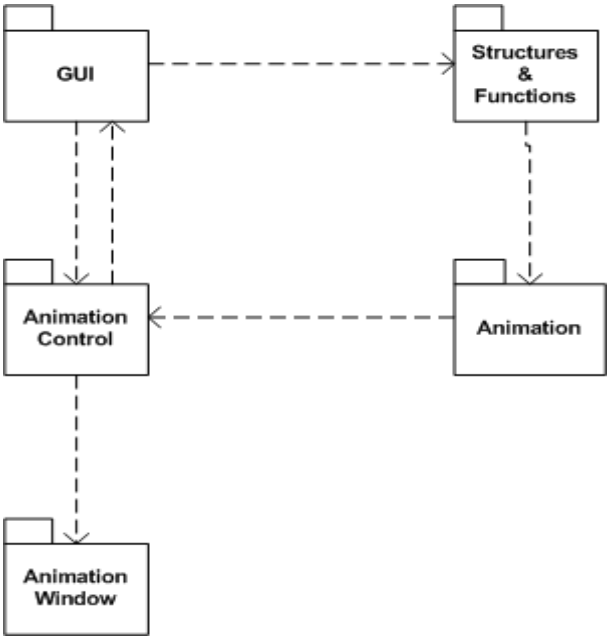
Section 2.2-2.3

Overall Architecture Description

TICS consist of five modules with different responsibilities.



Animation Window

This is the part of the GUI that draws the animation. The Animation Window modules responsibility is to draw the animations.

Animation Control

Animation Control keeps track of the animation and is the module that enables us to control it.

Animation

The Animation module receives all its information from the Structures & Functions module which it uses to create an animation list.

Structures & Functions

Structures & Functions contains all the structures and functions that this program can visualize.

GUI

The GUI module handles the graphical interface except for the drawing area where the animations are drawn.

Intermodule communication

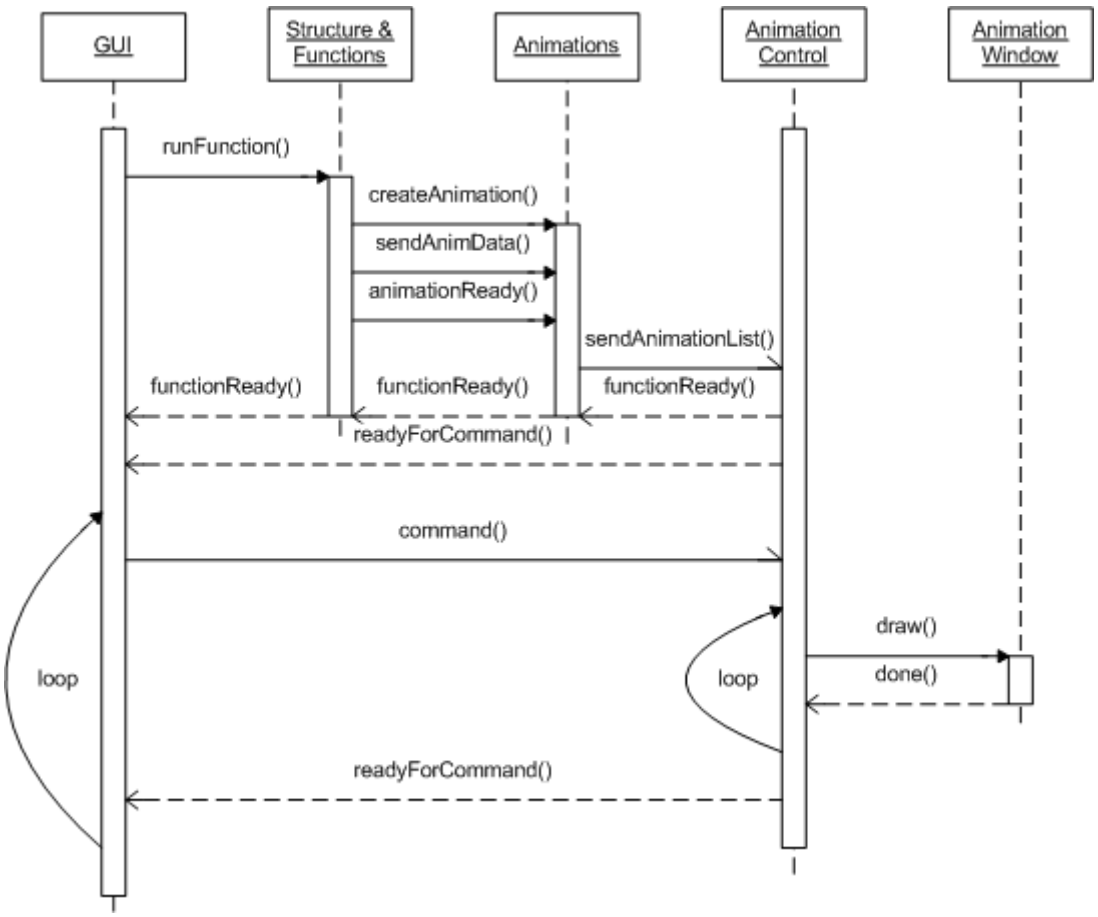
The GUI module will most of the time wait for a command from the user. When it receives a command, such as a mouse click on a button, one of three things can happen. It can satisfy the request itself, for example if the user requests a help menu. If it is a request to load a data structure

or run an algorithm, the GUI will transfer the request to the Structures & Functions module which will run the algorithm and send information to the Animation module. This module will then create an animation list visualizing the algorithm. This list is sent to the Animation Control that animates it and sends images to the Animation Window. Finally, the request from the user may be to affect the current animation in some way, i.e. play. In this case, the request is sent to the Animation Control module which takes the appropriate action. This can result in the Animation Control module sending commands to the GUI (enable or disable buttons) and the Animation Window module (to redraw the animation).

Detailed Architecture

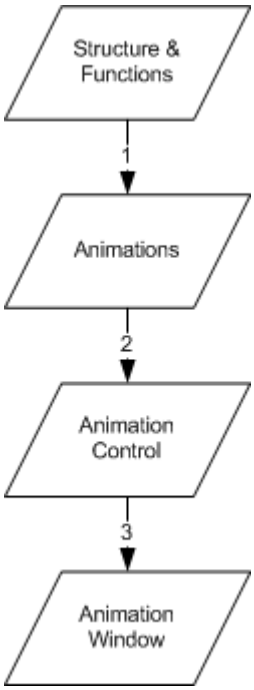
Sequence diagram

The following diagram shows what happens when the user tells TICS to run an algorithm, which is the main use of the system.



Data flow

Each number describes an arrow in the picture to the right.



1. As a function is executed in the structure & function module data is sent to the animation module. The data includes information on what happens when a function is executed.
2. The animation module has now created an animation list from the data that the structure & functions module sent. The data sent to Animation Control is the animation list which consists of the following: a start state with information on how the structure looks like before the animation begins. This includes sizes, positions, relations etc. The animation list also contains a list of events, or changes to the structure. This could include a object creation, deletion or moving.
3. The Animation Control interprets the animation list received from the Animation module. It creates a model of the structure according to the animation list start state. This model is then modified according to the events in the event list. It then creates frames or snapshot of this animation and sends to the Animation Window module. These frames contain the current interpolated state of the model, with information such as sizes, positions, relations, etc.

Control

The GUI needs to collect information from two other modules besides itself. The GUI needs to collect data from the Structure & Function module when a user tries to load a data structure or an algorithm. The data consists of available data structure or algorithms that the user can choose between. The GUI also has to collect data from the Animation Control module so that the GUI knows which Animation Control buttons that should be clickable.