OS2 - Project document

1. Personal information

   Stick Figure Animator
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2. General description

   Stick Figure animator can be used to create simple animations with stick figures. you can add figures and change their position in different frames. You can add speech and change their expression. The application calculates the frames between keyframes.

3. User interface

   The application is started by running Animator.scala which opens a window. In the window there are buttons on the left and right. On the bottom there is the timeline and beside it are its controls. In the center is the animation viewer.

   A new animation is instantly created. You can add stick figures by pressing “Figure” You have to enter the name of the structure used which there are currently “Basic” and “Dog”. You can add your own structures or customize the current ones in the file “Structures”

   With the stick figure you can move it or its joints by clicking and dragging. If you click a joint (some other than the center one) you lock it. By clicking the head you can add speech and change expression. Current expressions are “happy”, “sad” and “neutral.”

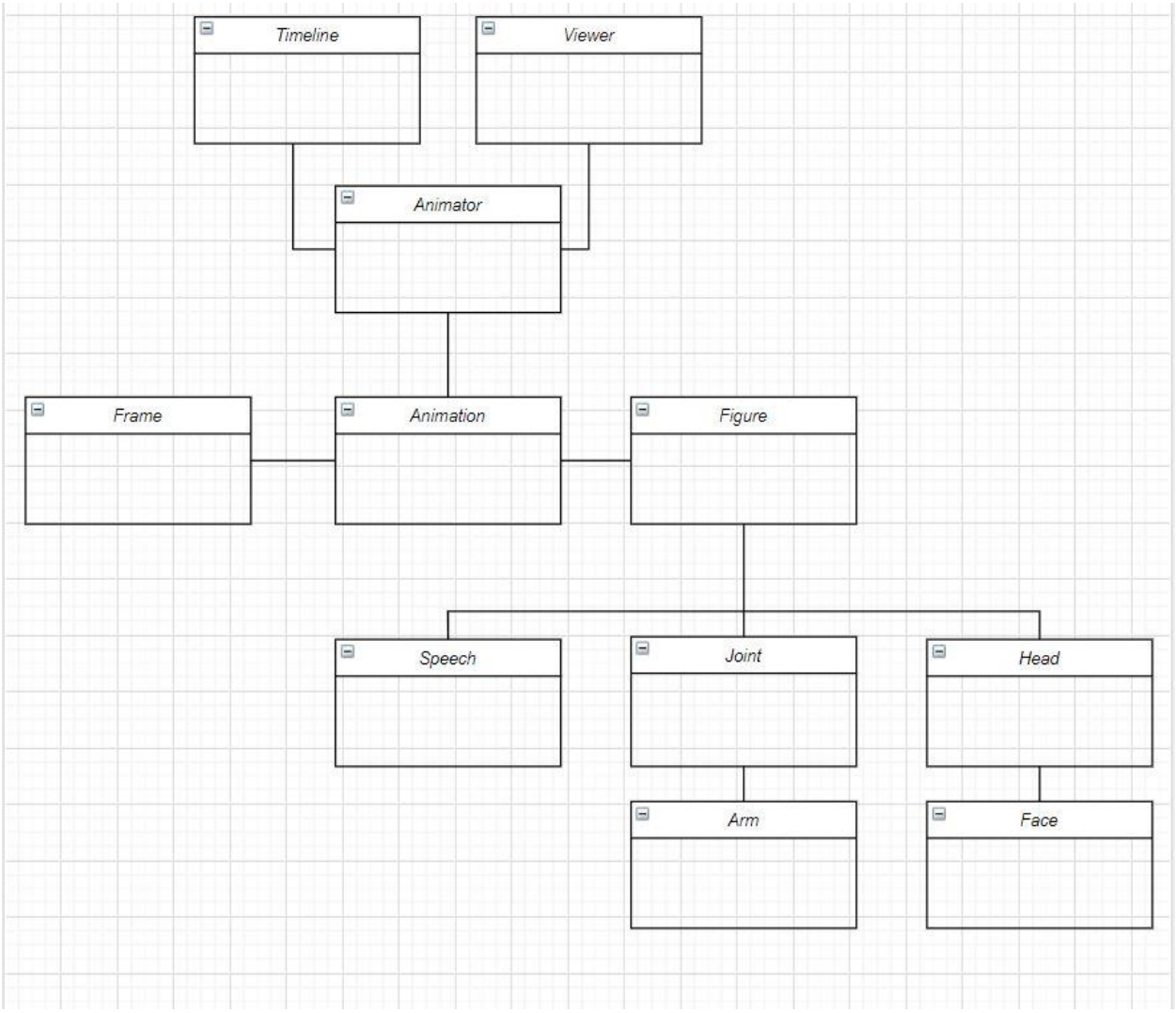
   From the button “background” you can change the background by typing the name of the file (including the extension). Currently there are two background files, basic.png and basic_2. You can add your own too.

   From the left you can load and save the file, start over and exit the program. Please note that saving an animation with a file name that already exists overrides it.

   On the left side of the timeline there are arrows to change the current frame and play button to play the animation. On the right side of the timeline there are buttons to add and remove frames at the end of the timeline. Also you can add/remove the keyframe of the

current frame. If you change something on a frame that is not currently keyframe, it automatically changes itself to one. Cursor on the timeline shows what is the current frame you are looking at.

4. Program structure



5. Algorithms

   The more complex algorithms are the one calculating the position of the joints and the one calculating interpolation between keyframes.

   The position of a joint is calculated in the following way:

   y = -sin(angle) * radius + parent.y

   x = cos(angle) * radius + parent.x

   The interpolation between keyframes:

   frame data on frame i = frame data in start + (frame data in start - frame data in end)*i / num of frames after the first one.

6. Data structures

   I used mostly ArrayBuffers since they are mutable and also applying is quick. I also used mutable maps for storing frame data so I can use the frames themselves as keys.

7. Files and Internet access

   There are two types of text files. One for saved animations and one for structures. Background is loaded from image files.

   The format of the structure file:

   1. Structure name.
   2. Joints.
   3. All the joints with the format:

      Name,ParentName,distanceToParent,angleToScene (degrees)

      No spaces.

   4. /Joints
   5. If it has head ParentName, Expression
   6. /Structure name

   The format of an animation file:

   1. Frame count
   2. Keyframe indexes
   3. Background file name
   4. Figures
      a. Structure name
      b. frame data
      c. children and their frame data

8. Testing

   Testing was done purely through the GUI of the program during developing.

9. Known bugs and missing features

   The viewer borders are not working so you can move the figures on the top of the menus.

10. 3 best sides and 3 weaknesses

    Best sides:

    - Interpolation
    - Simple GUI
    - Faces.

    Weaknesses

    - It is slow to move within frames.
    - Only three faces.
    - Changing the expression is a bit slow

11. Deviations from the plan, realized process and schedule

    I did not do the project as planned. First I implemented some of the logic. Then I created the basis of the GUI. Then I just implemented feature after feature. A lot of refactoring had to be done during the process.

12. Final evaluation

    I was in too much hurry in the end. There might be some bugs I don't know about. Also the project topic seemed a bit too large and there was not much time to plan it. If I started again I would do it steadily and slowly.

13. References

14. Appendixes