CPSC 526: Computer Animation
Assignment 1 (7%)

out: Thu Sept 14, 2017
due: in class Thu Sept 21, 2017

> Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page.

Name: ______________________________

Student Number: ______________________________

Question 1	/ 4
Question 2	/ 4
Question 3	/ 8
Question 4	/ 5
Question 5	/ 10
TOTAL	/ 31

1. (4 points) Disney animators defined a set of "Twelve Basic Principles of Animation", which are still used by animators today. The wikipedia page provides a reasonable summary of these. Is it fair to say that the laws of physics, or some exaggerated version thereof, actually capture many of the principles of animation? Which of the principles have nothing to do with physics, or only have a limited connection to the laws of phsyics?

2. (4 points) Name 5 different kinds of dance notation. Google and wikipedia are your friend here. Do full 3D recordings of human motions, i.e., as allowed by motion capture systems, eliminate the need for, or purpose of, dance notations? Why or why not?

3. (8 points) Here is your chance to show your talents at traditional animation. Use the `toonator` website to create a hand-drawn animation of between 20 and 50 frames in length about life in Vancouver or at UBC. This could be an event, an activity, something inspiring, something frustrating, etc. Have fun with this! Animations will mainly be scored for basic completion, but there will also be some subjective component to the score, based on their overall appeal, story, image quality, and motion quality. I'll show some of the best animations to the class, and so this can also be your chance for fame and fortune. This is not an art course and so expectations will be set appropriately.

   `http://toonator.com`

   Follow the `Sign In` link, and the following
   Sign up link to create an account. I would recommend signing up via the email account (see the envelop icon) rather than the facebook link, but it is up to you. Use any email address you like for this, although preferably one where you are ok to receive some junk email. While I have used my gmail address without any problems, I cannot vouch for how this site will use your email address. You will be sent a confirmation link by email in order to activate your account.

   It is recommended that you first experiment with a short test animation in order to become familiar with the interface and with saving the animation (see below). The 'help' link in the interface will take you to `http://toonator.com/wiki/Editor`, a page that describes all the elements of the interface. It will show you how to copy frames, insert new frames before or after the current frame,

   and much more. Note that even after you have saved an animation, you can choose to 'Continue' in order to continue with editing. To scroll to different parts of the frames timeline, drag the "Frame navigation" box to the left or right.

   You should Google `straight ahead vs pose to pose` in order to learn about two general methods for creating animation.

   When you save your animation (see the floppy disc icon), **include** `cs526` as part of the title for your animation. The URL for your animation will appear in the title bar after you have saved your animation. It is also available via the `<HTML>` *Share* icon.

   Give the URL for your animation:

   `http://toonator.com/toon/`________________________

   Briefly describe the process you used to create the animation.

4. (5 points) Math review

$$a = \begin{bmatrix} 1 \\ -3 \\ 2 \end{bmatrix},\ b = \begin{bmatrix} 2 \\ -1 \\ 4 \end{bmatrix},\ C = \begin{bmatrix} -1 & 1 & 0 \\ 1 & 0 & 3 \\ 1 & 2 & 2 \end{bmatrix},\ d = 2$$

For each of the following, compute the answer or, if it cannot be evaluated, state that it is a "nonsense" expression.

$b^T a$

$b\, a$

$a\, b^T$

$a^T b$

$a\, d$

$d\, C$

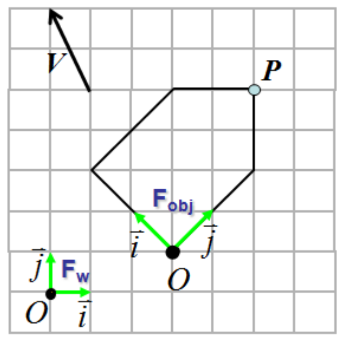
$b\, C$

$C\, a$

$b^T C\, a$

a^2

5. Affine Transformations



$$\begin{bmatrix} \\ \\ 1 \end{bmatrix}_{w} = \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix} \begin{bmatrix} \\ \\ 1 \end{bmatrix}_{obj}$$

(a) (4 points) Express point P and vector V in F_w and F_{obj}.

(b) (2 points) Give the 4×4 transformation matrix M that should be used to draw the house, i.e., that takes a point in known object coordinates and transforms it to world coordinates. Assume that z remains unaltered, i.e., $z_w = z_{obj}$. Verify that you get the correct answer for point P.

(c) (2 points) Given $M = Translate(a, b, 0)Rotate(z, \theta_1)Scale(c, c, c)$, provide the values of a, b, c, and θ_1 that would implement the given transformation.

(d) (2 points) Given $M = Rotate(z, \theta_2)Translate(d, e, 0)Scale(f, f, f)$, provide the values of d, e, f, and θ_2 that would implement the given transformation.