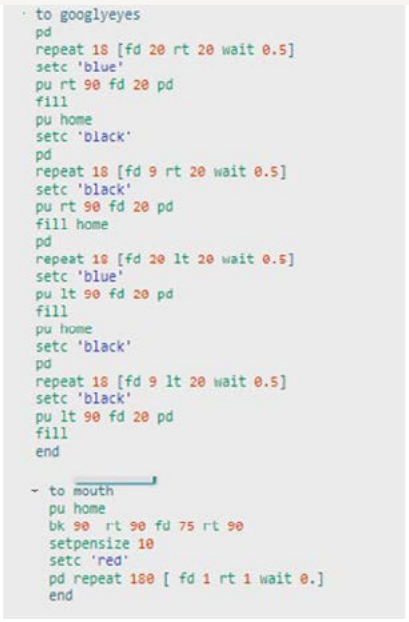
Designing a Computer Continuum for Grade 7-12 (Play the Long Game)

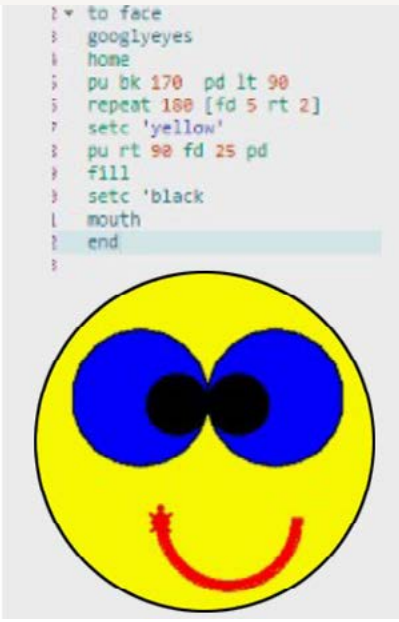
Team Members:
Daniel Beylerian and Karin Fleming

School District: Hastings Prince Edward DSB



```
to googlyeyes
pd
repeat 18 [fd 20 rt 20 wait 0.5]
setc 'blue'
pu rt 90 fd 20 pd
fill
pu home
setc 'black'
pd
repeat 18 [fd 9 rt 20 wait 0.5]
setc 'black'
pu rt 90 fd 20 pd
fill home
pd
repeat 18 [fd 20 lt 20 wait 0.5]
setc 'blue'
pu lt 90 fd 20 pd
fill
pu home
setc 'black'
pd
repeat 18 [fd 9 lt 20 wait 0.5]
setc 'black'
pu lt 90 fd 20 pd
fill
end

to mouth
pu home
bk 90  rt 90 fd 75 rt 90
setpensize 10
setc 'red'
pd repeat 180 [ fd 1 rt 1 wait 0.]
end
```



```
to face
googlyeyes
home
pu bk 170  pd lt 90
repeat 180 [fd 5 rt 2]
setc 'yellow'
pu rt 90 fd 25 pd
fill
setc 'black
mouth
end
```

What We Did

The overall focus of this project is to introduce coding in an engaging way at a young age in order to increase enrollment in computer sciences in the upper years of school. In addition, the hope is to increase female exposure to computer sciences so that the high school computer science classes are more reflective of the population.

Learning Goals

- Learn how to write language based code (Daniel is familiar with coding, Karin is not).
- Provide intermediate students with a basic programming language that is accessible to a larger number of students for whom python or java is too complicated as a starting point, and as a result will help them be more successful in secondary coding courses.
- Find connections between mathematics, science and computer coding and design effective, interesting lessons/units that will engage the students.
- Learn how this easier language based programming might be able to be incorporated into the secondary courses to help struggling students who are at risk of not being able to achieve their credits.
- Use this initiative to engage girls in coding at a young age, build their confidence and to get them and their families interested in STEM.

Completed Activities

- Lynx coding has been introduced to students in Grades 4 - 8.
- A secondary student learned Lynx coding as a self-directed project in TEJ 4M1 (Beylerian).
- A secondary student ambassador (Beylerian's student) who is acting as an assistant for Karin and a mentor for students who are working above and beyond the class expectations.
- Enrollment in Masterclass - Will Wright Teaches Game Design and Theory.

Completed Activities (continued)

- Language activity - physical coding to understand the importance of being specific and accurate with order and types of commands.
- Geometric Fun - Students are currently working on.
- Impromptu lesson - Interior and exterior angles of regular polygons. This was an impromptu lesson based on students' curiosity as to why the angles in a total turtle turn for a triangle have a sum of 360 but the angles in a triangle have a sum of 180.
- Beylerian introduced Interactive Storytelling to students as part of NDW 4M1 and BMI/BMX 3C/E in Octomester 5 (February 2021). Very well received. Students explored interactive stories related to marketing, social justice, self-advocacy, and life management. A curriculum related story was explored in the form of the Indegineous theme story "Beneath Floes". **https://bravemule.itch.io/beneathfloes**. A handful of students expressed interest in accessing the software to create similar stories.
- High School Locally Developed Math introduced to chat bots as an interactive tool for learning maths and having students customize the coding to create new scenarios. Examples of starting points:
    - Pizza Math Bot: **https://webchat.snatchbot.me/ea17fb8523ba2168ef283aa79b36ce1d7bb826d-762c3e2881ead156f9ce2598a**
    - Straight Up Math Skills Bot: **https://webchat.snatchbot.me/cf59211dcd011952250caa2efb-57337f61a0b003ae8d892012200fb6bc2323c7**

Next steps to continue our learning

In-Progress Activities:

- Daniel Beylerian engaged in learning on a weekly basis (Tuesdays at 7 PM) with the Interactive Storytelling Accelerator (ISA) training program by eLearning Secrets.
    - The goal is to learn how to create story scripts that can be built as coded games.

Planned Activities:

- Beylerian self-teaching and coached by ISA in Articulate product StoryLine 360 interactive story authoring tool.
- Beylerian self-teaching in Twine, a free interactive story authoring tool.
- Train Karin Fleming and Native Studies teacher in use and application of Twine and StoryLine 360 to Literacy and other HS subject.
- Train ICS secondary students to create GUI based Lynx games that tell Interactive Stories.
- Have ICS students create VR and AR interactive stories accessed through:
    - paper merge cube **https://mergeedu.com/cube**
      https://wakelet.com/wake/dfe475a9-8b99-4b93-aba2-40924fc9b47a
    - and google cardboard.
- Use these techniques in e-learning/distance/remote learning to engage students at a distance.

Next Steps (continued)

- Train ICS secondary students:
    - to create Twine based interactive stories.
    - **https://hotpinktech.blog/2018/11/04/an-interactive-story-with-57-north-for-merge-cube/**
    - to create Snatchbot.be customer service/learner support (FAQ) bots for embedding in our D2L BrightSpace VLE.
    - to create content based learning scenarios accessed through natural language questions and commands.
- Interactive Storytelling as part of BOH4M eLearning in Octomester 7 (Late April - May 2021).
    - Incorporate prepared IS to access understanding and application of course content
    - Have students create IS based presentations to communicate their responses to assignments.
- Mentor/Mentee program as part of ICS course in Octomester 8 (Late May-June 2021).
- Serious Games in ICS course using Lynx, Twine and Snatchbot.me.
- Beylerian's classes will act as an experimentation lab where students try these technologies, build software and share their learning with Fleming's students as showcases.

How We Shared Our Learning With Others

Unfortunately, due to the stressful start to the school year and all the precautions due to Covid, we are not nearly as far along as we would like to be. That being said, we are working diligently toward changing that situation and giving students opportunities to learn.

Students and teachers alike ran into some difficulties with coding that led to a discussion about glitches and problem solving issues. This came about when we were learning how to "fill" geometric shapes with colour. When following steps that should have allowed the enclosed figures to fill with colour, the shapes would not do so. Interestingly, when another person used the exact same code, it worked for them (a couple of times, then no longer). Further exploration of the code determined that it would work for some inputs while not for others. This was frustrating for students and teachers alike, but demonstrated the importance of perseverance and problem solving.

Using an ambassador from secondary school has been beneficial. It helps us look at problems from an alternative perspective and allows students to see that it is a cooperative learning experience, that we can learn from each other.

On an aside, we have joined **Masterclass** which has all sorts of learning opportunities in a wide variety of interest areas. We joined for the opportunity to learn from Will Wright, a game designer, but there are so many other interesting lessons that I would recommend taking advantage of the opportunity to join.

Moving forward we are well equipped to share our learning from our purchased resources, classroom experiences and trained student ambassadors.

Each teacher (Beylerian & Fleming) can reach their colleagues with demonstrations in a variety of curriculum areas.