INTERACTIVE FLOWCHART

Science Museum of Virginia

Ayyan Talib – School of Engineering: Computer Science
Dakota Bly – School of Engineering: Computer Science
Taylor Kaplan – School of Engineering: Computer Science
Nicole Hahne – School of Business
Leandra Bessell – School of Business
Haneen Sabbagh - School of Business

NOVEMBER 13, 2011
FACULTY ADVISOR: PROFESSOR ROBERT DAHLBERG & PROFESSOR DEBRA DUKE
ABSTRACT

The influence of computing is felt daily and experienced on a personal, societal, and global level. Computer science is the study of computational thinking, or how to use logical thinking and abstraction to develop generalized solutions to complex problems and has driven innovation in every industry and field of study. Children should be educated to contribute to the digital framework with maturity, confidence, and a critical attitude. To do that, children should learn to program from a very early stage at school which can be the right way to motivate them to develop skills such as reasoning, problem resolution, logic, creativity, perseverance, and teamwork. As computing has become an integral part of our world, public demand for computer science education is high. Most parents want their child's school to offer computer science courses and most Americans believe computer science is as important to learning as is reading, writing, and math.

In 1995, the Virginia Board of Education published Standards of Learning (SOL) in English, mathematics, science, and history and social science for kindergarten through grade 12. The SOL was developed for all academic content areas as it provides a framework for instructional programs designed to raise the academic achievement of all students in Virginia and prepare them for college and careers. Every seven years, the Board of Education reviews the Standards of Learning. The 2016 Virginia General Assembly approved legislation requiring that the Standard of Learning include computer science and computational thinking, including computer coding. As a result, the Computer Science Standards of Learning were developed in 2017 with input from parents, teachers, administrators, representatives from higher education, and the business community. The standards are organized into the following content strands: Computing Systems, Networks and the Internet, Cybersecurity, Data and Analysis, Algorithms and Programming, and Impacts of Computing.

For this project, CS318, the students of engineering and business came together in talks surrounding a new exhibit, the Forge, at The Science Museum of Virginia. The Forge is part maker space, part interactive exploration, part community innovation sandbox. This exhibit is for the purpose of peaking children’s interest in STEM careers. Mr. Maurakis, Chief Scientist at The Science Museum, asked that we develop a design program for teaching children about computer science, specifically algorithms. The concept of our product is a web based game design, using HTML, to engage middle school age children in coding by specifically making a coding game so the children can have fun while playing the games, yet also learn algorithms such as loops, conditionals, variables and much more. The game’s basis is Blockly, a library for building visual programming. On a touchscreen interface, children will click and drag the blocks into a proper order and format the code to cause an action to occur in the game. The game will have different levels ranging from easy to difficult. As the student passes each level, he/she has to do more to engage in the game and use skills such as reasoning, problem resolution, logic, creativity, and perseverance. As the student has fun and plays the games more often, this will be the breaking point for the child to be more interested in how computer science works and the capabilities computer science has to offer.
The Sternheimer award is vital for our success in the present and a success for the future. Our project will help future coders into making this world into a better place. We need all the help we can get. Here are our expenses for the present and the near future:

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Developers</td>
<td>$90 a week</td>
<td>As more students are interested in the exhibits, we will need more games, more levels, more ideas.</td>
</tr>
<tr>
<td>License to characters</td>
<td>Any</td>
<td>We could license characters into our games (Disney, Pixar, ETC.) to get the kids more involved and excited about the many games we have to offer.</td>
</tr>
<tr>
<td>More screens, monitors</td>
<td>$200 to $400 per monitor</td>
<td>As more kids will come to the Science Museum of VA, we will need more monitors for the kids to interact with.</td>
</tr>
<tr>
<td>Teachers (one or two)</td>
<td>$15 an hour</td>
<td>Teachers could help aid the students with questions and/or understanding the fundamentals of coding/the game.</td>
</tr>
<tr>
<td>Course for teachers</td>
<td>$50 to $100</td>
<td>Courses will be taught by developers and experts so teachers have a core understanding of the project to help pass on knowledge to the students.</td>
</tr>
</tbody>
</table>
Image of The Forge and its many exhibits.

Image of Blocky and how the kids will use ‘blocks’ to help them learn computational thinking.