

## **CS ACTIVITIES FOR MIDDLE SCHOOL KIDS**

Instructor: Dola Saha

All Groups together (total 15 kids): [Sessions 1 and 2]

15th June, 9:20A.M. - 9:55A.M., and 10:00A.M.-10:30A.M. (TA: Shantanu)

Group 1 (5 kids): [Session 3]

16th June, 9:20A.M. - 10:30A.M. (TA: Tia)

Group 2 (5 kids): [Session 3]

16th June, 10:45A.M.-11:45A.M. (TA: Tia)

Group 3 (5 kids): [Session 3]

17th June, 9:10A.M. - 10:30A.M. (TA: Shantanu)

### **Session 1:**

CS Unplugged (Searching Algorithm) ~ 20mins

Think about how you would search for the songs and albums on an MP3 player such as an iPod. How could it be done more efficiently?

a) Linear Search

Hand over 14 album names in 14 small sheets of paper to 14 kids, they are in randomized order. Give another child a container with ~10 candies in it. His/her job is to find a given album name. He/she can “pay” to look at a particular card/sheet. If he/she finds the correct album before using all the candies, he/she gets to keep the rest. Count the steps needed to find the album.

b) Binary Search

Hand over 14 artist names in 14 small sheets of paper to 14 kids, but in ordered fashion. Give another child a container with ~10 candies in it. His/her job is to find a given artist name. He/she can “pay” to look at a particular card/sheet. If he/she finds the correct artist before using all the candies, he/she gets to keep the rest. Count the steps needed to find the artist. Try to introduce the binary search algorithm here, by reminding the kids that the list is sorted now.

c) Talk about the bigger picture, how computers work, minimize number of tasks, and that is why we have different algorithms.

### **Session 2:**

Introduction to Robots ~ 40mins

1) What is a Scribbler Robot?

Handover 3 robots to the kids in a group of 5. Introduce the Robot, and show the top view and

the bottom view in projector, volunteers help the kids identify the different parts.

a) Sense - Infrared Detectors and Light Sensors, Line Sensors

b) Act - LED Lights, Infrared Emitters, Speaker, Wheels

2) What can I do with it?

Show one Demo (Demo 4: Avoiding Objects Behavior)

3) How can I program?

Program using the S2 GUI, and download the program to the robots.

Assign 1 laptop to 2 kids. Total 7 or 8 groups. Show how to open GUI. Talk about each of the components, and let them play with the GUI. Volunteers help the kids when required. Show specifically how to insert notes. Show how to move the wheels, front, back and rotate.

### **Session 3:**

Programming the Robots (Scribble, Sing and Dance with the Robots) ~1hr

1) Hand over the musical note sheet (prepared before) to the kids to help them program. Each volunteer works with one group (2-3 kids) to program.

2) Let them program 'Happy Birthday' notes, and run on robot.

3) Insert Loops, and run on the robots.

4) Help them to draw the first letter of their name, requires wheel action. Ask the students to draw it on pencil & paper, and then help them in coding. Finally run on robots, insert a marker and draw that on a foam board. This requires couple of trials to finally get the letter correct, and they get a feeling of debugging.

5) Finally change the LED settings, on and off after inserting delay, and run on the robot. The whole procedure is built gradually, one functionality at a time. Final program draws the first letter of a student's name while playing 'Happy Birthday' notes and blinking LEDs, all running in infinite loop.