

1. Introduction

For this project, a visualization system for grouping students into project groups has been developed.

2. Workflow

2.1. Data Cleaning

Data was cleaned by the removal of data fields in the Microsoft Excel file. Data fields containing student generated names, numerical values and interests were saved to a CSV file. Student interests were manually summarized with one keyword to simplify groupings.

```
1 id,InformationVisualizationSkills,StatisticalSkills,MathematicsSkills,ArtisticSkills,Computer
2 Sturgis Podmore,6,3,5,2,10,10,8,6,3,10,10,10,Sports
3 Reginald Cattermole,4,5,7,3,9,9,1,4,2,10,7,10,Gaming
4 Draco Malfoy,4,1,2,1,9,9,3,8,9,9,10,10,Reading/Travel
5 Ludo Bagman,1,5,5,1,7,8,3,2,1,10,8,7,Gym
```

2.2. Basic Code Structure

Data from the CSV file are retrieved and stored as objects in an array.

```
d3.csv("data.csv").then(function(data){
  data.forEach(function(d) {
    d["InformationVisualizationSkills"] = +d["InformationVisualizationSkills"]
    d["StatisticalSkills"] = +d["StatisticalSkills"]
    d["ArtisticSkills"] = +d["ArtisticSkills"];
    d["MathematicsSkills"] = +d["MathematicsSkills"]
    d["ComputerUsageSkills"] = +d["ComputerUsageSkills"]
    d["ProgrammingSkills"] = +d["ProgrammingSkills"]
    d["HCIProgrammingSkills"] = +d["HCIProgrammingSkills"]
    d["UXEvaluationSkills"] = +d["UXEvaluationSkills"]
    d["CommunicationSkills"] = +d["CommunicationSkills"]
    d["CollaborationSkills"] = +d["CollaborationSkills"]
    d["CodeRepositorySkills"] = +d["CodeRepositorySkills"]
    dataArray.push(d);
  })
  createCircles(dataArray);
});
```

Function createCircles() retrieves object data values and creates circle objects.

```
function createCircles (dataArray) {
  var idArray = dataArray.map(a => a.id);
  var color = [];
  for (i = 0; i < dataArray.length; i++){
    color.push("#"+((1<<24)*Math.random()|0).toString(16))
  }
  for (i = 0; i < dataArray.length; i++){
    circles.push({
      x: Math.round(Math.random() * (1250 - 40) + 40),
      y: Math.round(Math.random() * (500 - 40) + 40),
      z: 5,
      id: idArray[i],
      color: color[i],
      interests: dataArray[i].Interests
    });
  }
  drawVisualization(circles);
}
```

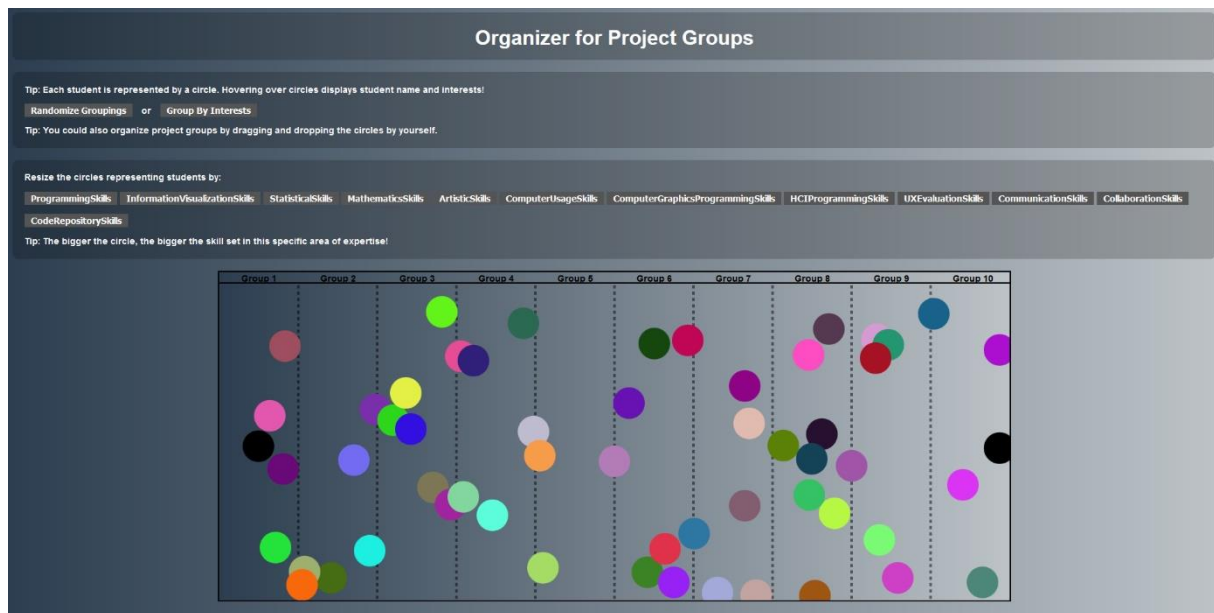
Using data from the circle objects, SVG circles are appended to an SVG canvas.

```
function drawVisualization(circles) {
  var svg = d3.select("#canvas"),
      width = +svg.attr("width"),
      height = +svg.attr("height") ;

  svg.selectAll("circle")
    .data(circles)
    .enter().append("circle")
      .attr("id", function(d) { return d.id })
      .attr("cx", function(d) { return d.x; })
      .attr("cy", function(d) { return d.y; })
      .attr("r", function(d) { return 5*d.z; })
      .style("fill", function(d) { return d.color })
      .call(d3.drag()
        .on("start", dragstarted)
        .on("drag", dragged)
        .on("end", dragended))
      .append("title").text(function(d) {return ("Name: " + d.id + "\nInterests: " + d.interests); })
}
```

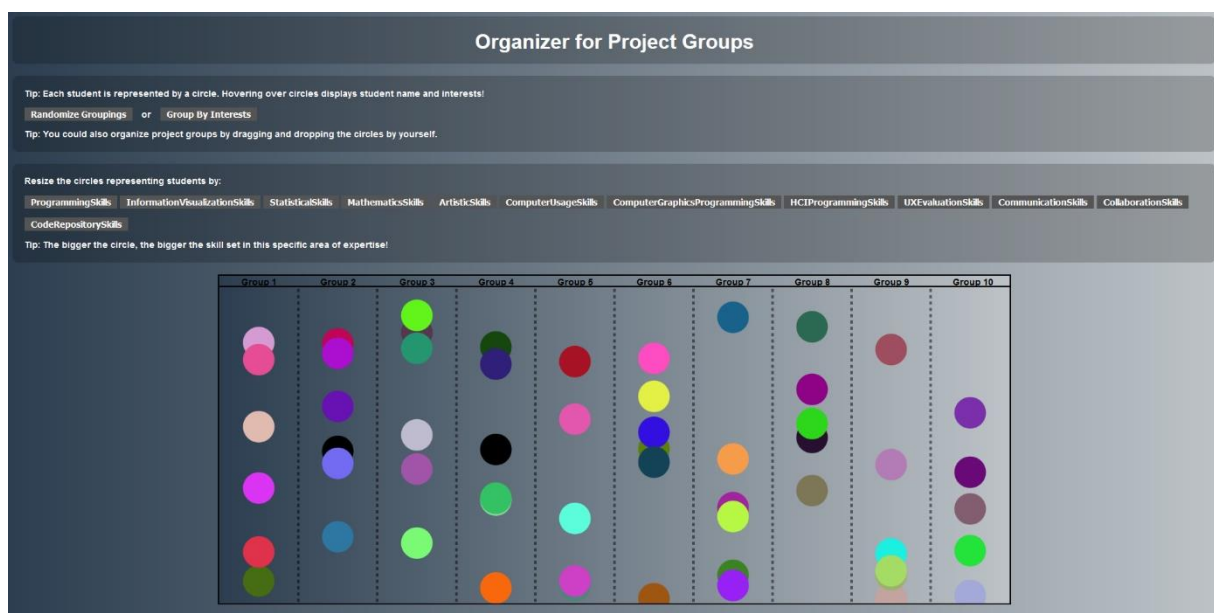
3. Result

Link in header.



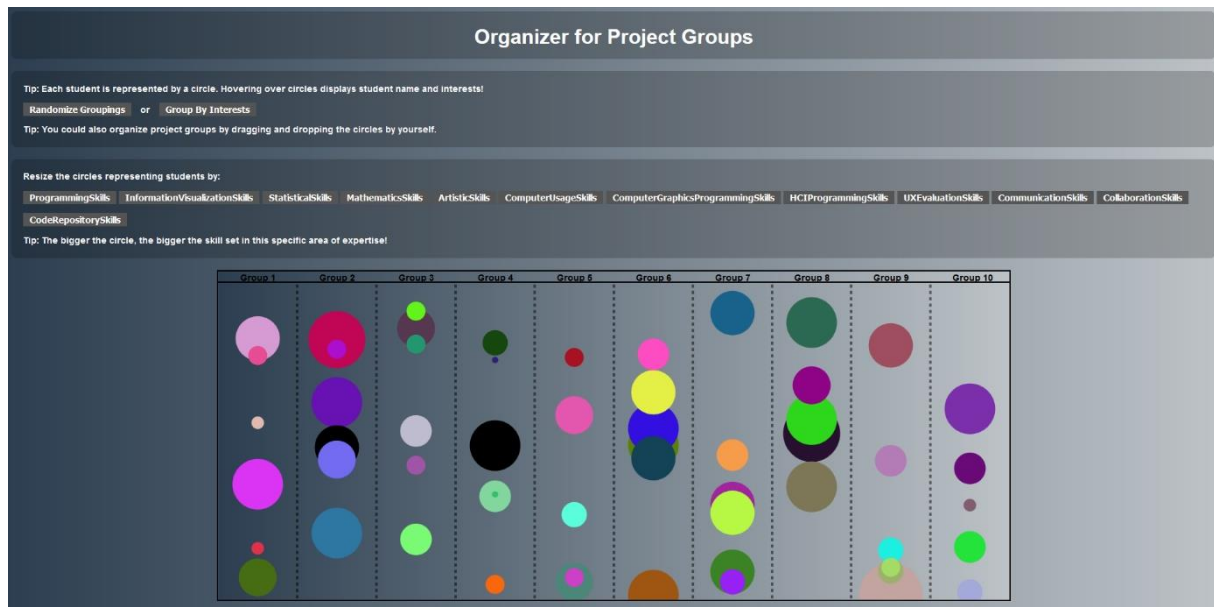
Project groups can either be randomly generated or generated based on common interests. Furthermore, groups can be organized manually by dragging circles.

Grouped by common interests:

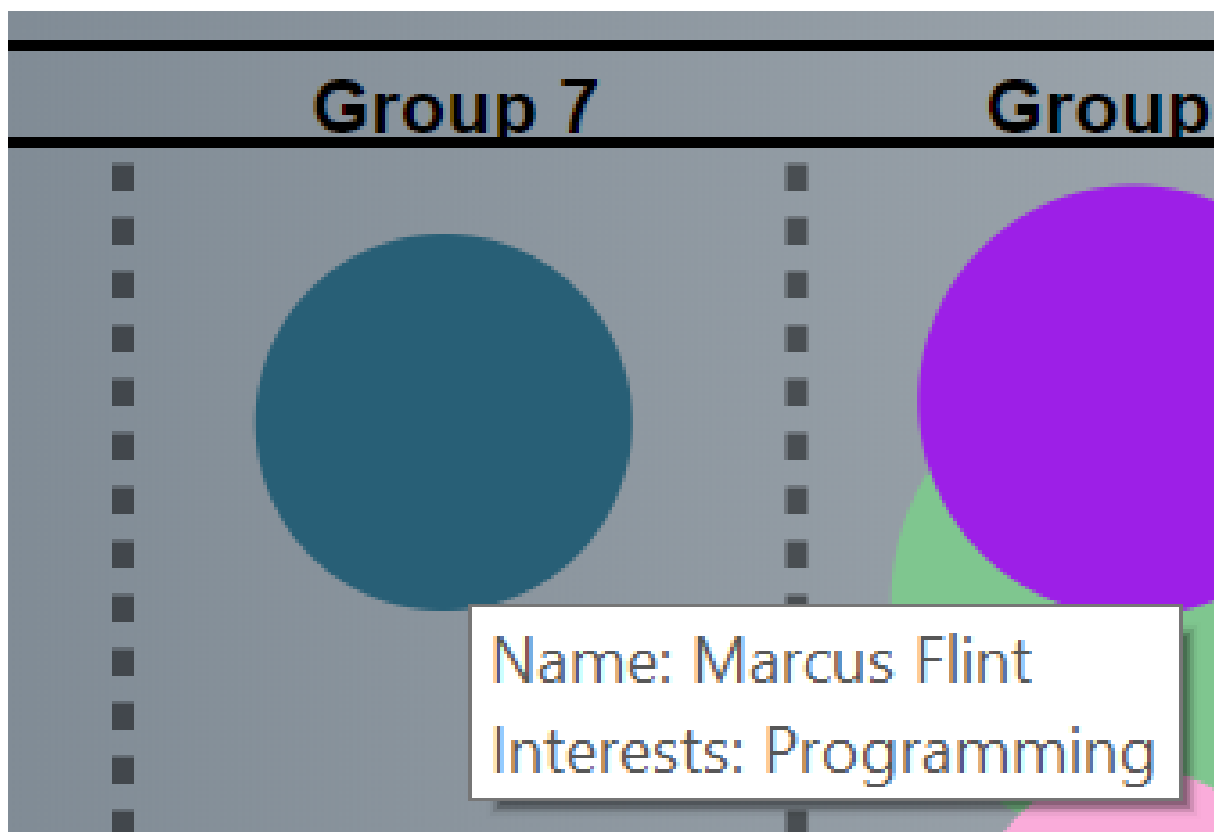


<https://swedhag.github.io/dh2321-project1/>

Students can be filtered based on competences in certain areas of expertise. Larger circles equal larger competence.



Hovering over circles display student details:



4. Theory

The visual glyph property *color* [1] is used for student separation. *Spotfire* having mapped population size of counties to dot sizes [1] inspired the re-sizing by competences functionality. Primarily, overview, filter by competences and details-on-demand have been implemented [2].

5. References

- [1] Salvendy, G. (2012). Information Visualization. In Handbook of Human Factors and Ergonomics (pp. 1209-1236). Hoboken, NJ, USA: John Wiley & Sons.
- [2] Shneiderman, B. (2003). The Eyes Have It: A Task by Data Type Taxonomy for Information Visualizations. In The Craft of Information Visualization (pp. 364-371).