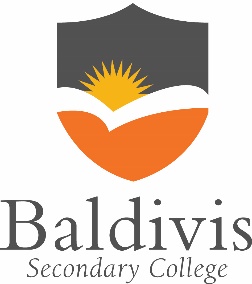
**Mathematics Specialist Unit 1**

# Investigation 1

 **Combinatorics**

**Weigthing 5% Due Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

The concepts and skills included in this investigation relate to the following dot points within the WA Mathematics Specialist syllabus:

* + 1. solve problems involving permutations
    2. use the multiplication and addition principle
    3. solve problems involving permutations involving restrictions with or without repeated objects

1.1.6 solve problems and prove results using the pigeon-hole principle

1.1.7 solve problems involving combinations

You need to investigate the following problem.

On the first day of university, all the students have a welcome meeting in the amphitheatre. At this meeting there must be at least two students who will have the same number of friends. Investigate.

**The format of the investigation report must be a typed report, but hand written calculations can be embeded into the document. A maximum of 3 pages. Reports should be submitted electronically via Connect.**

**The report should include the following:**

* an outline of the problem and context (Clarifying the Problem)
* the method used to find a solution, in terms of the mathematical model or strategy used (Choosing and Using Appropriate Mathematics and justifying the choices)
* the application of the mathematical model or strategy, including
* mathematical calculations and results, using appropriate representations
* the analysis and interpretation of results, including consideration of the reasonableness and limitations of the results
* the results and conclusions in the context of the problem.
* a short bibliography (including websites) if applicable