

# Auditions in the University of Nottingham A Cappella Society: A Modified Gale-Shapley Approach

## Introduction

Auditions in musical societies are crucial for aligning prospective members with appropriate performance groups. These processes often involve complex decision-making, where both auditionees and groups must navigate their preferences to achieve optimal outcomes. The University of Nottingham A Cappella Society, facing this annual challenge, has adopted a modified version of the Gale-Shapley algorithm to streamline its audition process. This provides a detailed examination of the algorithm's application within this context, highlighting its effectiveness in ensuring fair and stable matches between members and groups.

## Methodology

### Audition Scheduling and Initial Contact

The audition process begins with prospective members expressing their interest by visiting the University of Nottingham A Cappella Society's website and clicking on the "Join Us" link. This action triggers an automated system that sends an email to the auditionee, containing a personalised link for scheduling their audition slots.

**From:** `acappella@uonsu.com`

**To:** `[Auditionee_Email]`

**Subject:** `Welcome to the UoN's A Cappella Society!` 🎤

We're thrilled to have you join one of the largest student-run singing societies on campus, featuring multiple award-winning groups. Our try-its are coming up soon! Find out more on our [website](#).

To stay in the loop, we invite you to join our **WhatsApp Community**. It's the best way to get real-time updates and connect with fellow members.

[Join WhatsApp Community](#)

[Book Your Audition](#)

[Our Groups](#)

If you have any questions, feel free to reply to this email. We're here to help!

Looking forward to seeing you at the auditions!

Best regards,

The A Cappella Committee

Upon receiving this email, the auditionee can access the scheduling platform, where they select available time slots offered by various group leaders. The platform is designed with a real-time update feature that allows group leaders to monitor bookings as they occur, ensuring that no double bookings or scheduling conflicts arise.

### Audition Procedure and Callback Management

Auditions take place over several days, during which group leaders assess the auditionees' vocal abilities and suitability for their groups. After the initial auditions, some groups may decide to conduct callbacks for a second round of evaluations. The communication regarding callbacks is managed individually by the group leaders. Callbacks, if required, are conducted between September 30th and October 4th. Group leaders are responsible for notifying auditionees of the callback results; the society is responsible for notifying auditionees of their final audition outcome.

### **The Modified Gale-Shapley Algorithm**

The core of the audition process is the matching of auditionees to groups using a modified version of the Gale-Shapley algorithm. Traditionally, the Gale-Shapley algorithm involves two sets of participants—proposers and acceptors—each ranking the other to achieve a stable match (Gale and Shapley, 1962). In this modified version, auditionees act as proposers, while a cappella groups function as acceptors.

Upon completion of auditions and callbacks, group leaders categorise auditionees into two groups: "firm" offers and "reserve" offers. Firm offers are extended to the auditionees who are the top choices for specific roles within the group, while reserve offers serve as a backup should any firm offers be declined. Each group's capacity determines the number of firm offers they can extend. An example of an offer email is provided below:

**From:** acappella@uonsu.com  
**To:** [Auditionee\_Email]  
**Subject:** Congratulations on Your Offer! 🎉

Dear [Auditionee],

We are delighted to inform you that you have been accepted! Congratulations on this fantastic achievement.

To accept your offer, please click here and follow the instructions.

We look forward to welcoming you to our society!

If you have any questions or need assistance, please don't hesitate to reach out through our website at [www.nottscappella.co.uk/contact-us](http://www.nottscappella.co.uk/contact-us)

You'll need to accept this offer as soon as possible, and within twelve hours, otherwise it may expire.

All the best,

The A Cappella Committee

### **Offer Submission and Ranking**

Group leaders submit their firm and reserve offers through an online form specifically designed for this process. The form is structured to capture offers for each vocal part (e.g., Soprano, Alto, etc.), with a clear distinction between firm and reserve choices. Leaders must submit their offers by 11:59 PM on October 4th, after which no modifications are allowed. This strict deadline ensures that the matching process can proceed without delays. The system employs a deferred acceptance strategy, wherein firm offers are processed first. If an offer is rejected, the system automatically promotes the corresponding reserve offer to a firm offer. This mechanism maintains stability in the matching process and ensures that all available spots are filled efficiently.

The dissemination of results is a critical phase of the audition process, conducted over the weekend of October 5th and 6th, starting at 9am on the 5th and ending at around 4pm on the 6th. The system prioritises members based on the type of offers they receive, as outlined below:

- 1. Members with Only Firm Offers:**

**Priority:** First to receive emails.

**Process:** Initial batch of emails is sent, followed by a delay to allow responses. Offers rejected by members are removed from the pool, and corresponding reserve offers are promoted.

- 2. Members with Both Firm and Reserve Offers:**

**Priority:** Second to receive emails.

**Process:** Follows the same procedure as above, ensuring all firm offers are addressed before promoting reserves. Offers rejected by members are removed from the pool, and corresponding reserve offers are promoted.

3. **Members with Only Reserve Offers:**

**Priority:** Third in line, contingent upon reserve offers being promoted to firm offers.

**Process:** Reserve offers are converted to firm offers if previous firm offers are rejected.

4. **Members with No Offers:**

**Priority:** Last to receive communication.

**Process:** These members, typically a small number, are offered membership in "Chordally Invited."

The integration of the modified Gale-Shapley algorithm has markedly improved the audition process for the University of Nottingham A Cappella Society. By automating and systematizing the matching process, this approach effectively aligns member preferences with the needs of various groups, all while upholding principles of fairness and transparency. The algorithm's deferred acceptance mechanism has been particularly successful in managing the complexity of handling multiple offers and rejections, thereby minimizing the risk of unfilled positions and ensuring higher satisfaction among members.

A significant benefit of this system is its ability to eliminate the stress associated with ranking preferences. Previous versions of the audition process allowed for explicit rankings, which sometimes led to concerns about member welfare when these rankings became known. The current system, which treats all firm (rank 1), and reserve (rank 2) offers equivalently without disclosing rankings, addresses these concerns and complies with the Students' Union's welfare guidelines. This method, which successfully balances the preferences of auditionees with the capacity limitations of groups, offers a model that has been effectively applied by other organisations facing similar challenges, like the NHS Oriel system and US Medical School Matching System.