Formatting Instructions for the 25th International Conference on Autonomous Agents and Multiagent Systems

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ABSTRACT

This document outlines the formatting instructions for submissions to AAMAS-2026. You can use its source file as a template when writing your own paper. It is based on the file '`sample-sigconf.tex`' distributed with the ACM article template for LaTeX.

KEYWORDS

Algorithms, Coalition Formation

ACM Reference Format:

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1 INTRODUCTION

This document explains the main features of the '`aamas`' document class, which is essentially identical to the '`acmart`' document class provided by the ACM. The only difference is a minor modification to allow for the correct copyright attribution to IFAAMAS. For detailed documentation of the original document class, please refer to the relevant website maintained by the ACM:

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\documentclass[sigconf,anonymous]{aamas}
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```

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2 LITERATURE REVIEW

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Provide a short abstract using the '`abstract`' environment.

Finally, specify a small number of keywords characterising your work, using the '`\keywords`' command.

3 NOTATIONS

3.1 Coalition Structure (CS)

A coalition structure (CS) is the partition of the players into one or more coalitions. For example, when $n = 8$, some examples of CS are $\{\{1,2,3\},\{4,5\},\{6,7,8\}\}$, $\{\{1,7\},\{2\},\{3,5,8\},\{4,6\}\}$, and $\{\{1,2,3,4,5,6,7,8\}\}$. The last CS where all players form one single coalition is called a grand coalition.

In the symmetric game, all players are treated equally. As a result, two CSs that are equivalent up to a relabeling of players yield the same reward distribution. Also, within a given CS, all players belonging to coalitions of the same size receive the same rewards. For example, consider the two CSs $\{1,2,3\},\{4,5,6\},\{7,8\}$ and $\{1,3,7\},\{2,5,8\},\{4,6\}$ which are equivalent up to a relabeling of players. The rewards received by players 1, 2, 3, 4, 5, 6 in the first CS are the same as those received by players 1, 3, 7, 2, 5, 8 in the second CS.

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This model differs from the standard cooperative game model underpinning Shapley and core values.

4 DYNAMIC BETRAYAL MODEL

In general, coalition formation dynamics can involve both splitting and merging of coalitions, making the analysis complex. We focus on a simpler model in which only splitting is allowed. Initially, all players belong to a single grand coalition, which may undergo a sequence of splits. This process continues until no player has an incentive to leave her current coalition and form a smaller one; we will define incentive formally below. In each coalition of size $i \geq 2$, there is a player who may initiate a betrayal by pulling at most i players (including herself) away from the rest of the coalition.

4.1 Nash Equilibrium

The definition of Nash Equilbrium is the set of strategies such that no player can unilaterally deviate from their strategy to get a higher payoff, given the strategies of all other players. Formally, we can let A to be the set of players, S_i to be the set of strategies available to players, S as the strategy profiles, u_i as the payoff function of each player i. Then $s^* \in S$ is a Nash Equilibrium of a strategic gaame if and only if $\forall i \in A$ and $\forall s_i \in S_i$,

$$u_i(s_i^*, s_{-i}^*) \quad \geq \quad u_i(s_i, s_{-i}^*) \tag{1}$$

In this research, as the players are symmetric and all players have a linear demand function $p = A - bx$ with a constant cost c, the Nash Equilibrium can be found as follows:

$$\frac{(A-c)^2}{bn_C(m+1)^2} = \frac{D}{n_C(m+1)^2} \tag{2}$$

where $D = \frac{(A-c)^2}{b}$, n_C is the number of players in coalition C, and m is the number of coalitions in the game.

4.2 Integer Partition (IP)

This research has referenced to the Integer Partition (IP) algorithm developed by Rahwan et al. The algorithm first creates a multiset of positive integer whose sum is n. For example, $n = 8$, the multiset includes $[4, 3, 1]$, $[2, 2, 2, 2]$ and $[3, 3, 2]$. Then it searches the space by coalition size, and eliminates the search spaces where their maximum utility is smaller than the lower bound.

Our version of IP will enumerate through all the multisets and compute a certain value for them which the computation will be explained in section 4.3 and 4.4.

A huge advantage of enumerating throught the multisets is to avoid enumerating the set of coalition structure's n players, whose size is larger than $(\frac{n}{\log n})^n$, while the multisets of n has a much smaller size of at most $e^{\Theta(\sqrt{n})}$.

In the following sections, we will define two value functions V^D and V^P, which will be named as the default value function and the pessimistically value function respectively. These values are responsible for defining the stable CS.

Table 1: Locations of the first five editions of AAMAS

Year	*City*	*Country*
2002	Bologna	Italy
2003	Melbourne	Australia
2004	New York City	USA
2005	Utrecht	The Netherlands
2006	Hakodate	Japan

4.3 Default value function

The default value function $V^D(S, i)$ is the reward received by any player in a size-i coalition when the CS is fixed. For example, $V^D([3], 3) = D/6$, $V^D([2, 1], 2) = D/18$, and $V^D([2, 1], 1) = D/9$.

4.4 Pessimistically value function

The pessimistically anticipated value function $V^P(S, i)$ is the pessimisitically anticipated reward (PAR) a player in a size-i coalition might eventually obtain, after any sequence of incentivized betrays by any players.

By incentivized betrayals, we refer to a betrayal initiated by a player such that their PAR with the new CS is strictly better than her default value with the current CS.

Since coalitions can only be split but not merge in the dynamic betrayal model, V^P can be defined recursively. Let U be the IP $[1, 1, \ldots, 1]$, where 1 occurs n times. This corresponds to the CS where each player forms a coalition by itself. Since no further betrayal can occur from U, $V^P(U, 1) = V^D(U, 1)$. Then $V^P(S, i)$ for any IP $S \neq U$ and $i \in S$ will be defined recursively, going from IPs with the most number of coalitions to the least (the grand coalition).

Before we move forward, we will define a few notation to simplify the presentation.

4.4.1 Removal. Given a multiset S and $i \in S$, let $S - i$ denote the multiset formed by removing S from one occurences of i. For example, when $S = [2, 2, 2, 2, 1]$, $S - 2 = [2, 2, 2, 1]$ and $S - 1 = [2, 2, 2, 2]$.

4.4.2 Splitting. Given a multiset S, $i \in S$ and $1 \leq j < i$, let $B(S, i, j)$

4.4.3 title.

4.5 Example

4.6 Sequential Blocking

4.7 Tables and Figures

Use the '`table`' environment (or its variant '`table*`') in combination with the '`tabular`' environment to typeset tables as floating objects. The '`aamas`' document class includes the '`booktabs`' package for preparing high-quality tables. Tables are often placed at the top of a page near their initial cite, as done here for Table 1.

The caption of a table should be placed *above* the table. Always use the '`\midrule`' command to separate header rows from data rows, and use it only for this purpose. This enables assistive technologies to recognise table headers and support their users in navigating tables more easily.

Use the ‘`figure`’ environment for figures. If your figure contains third-party material, make sure to clearly identify it as such. Every figure should include a caption, and this caption should be placed *below* the figure itself, as shown here for Figure 1.

Figure 1: The logo of AAMAS 2026

In addition, every figure should also have a figure description, unless it is purely decorative. Use the ‘`\Description`’ command for this purpose. These descriptions will not be printed but can be used to convey what’s in an image to someone who cannot see it. They are also used by search engine crawlers for indexing images, and when images cannot be loaded. A figure description must consist of unformatted plain text of up to 2000 characters. For example, the definition of Figure 1 in the source file of this document includes the following description: “Logo of AAMAS 2026 – The 25th International Conference on Autonomous Agents and Multiagent Systems.” For more information on how best to write figure descriptions and why doing so is important, consult the information available here:

https://www.acm.org/publications/taps/describing-figures/

The use of colour in figures and graphs is permitted, provided they remain readable when printed in greyscale and provided they are intelligible also for people with a colour vision deficiency.

5 CITATIONS AND REFERENCES

The use of the BibTeX to prepare your list of references is highly recommended. To include the references at the end of your document, put the following two commands just before the ‘`\end{document}`’ command in your source file:

```
\bibliographystyle{ACM-Reference-Format}
\bibliography{sample}
```

Here we assume that ‘`sample.bib`’ is the name of your BibTeX file. Use the ‘`\cite`’ command to produce citations to your references. Here are a few examples for citations of journal articles [4, 11], books [7], articles in conference proceedings [5], technical reports [6], Master’s and PhD theses [1, 3], online videos [9], datasets [2], and patents [10]. Both citations and references are numbered by default.

Make sure you provide complete and correct bibliographic information for all your references, and list authors with their full names (“Donald E. Knuth”) rather than just initials (“D. E. Knuth”).

ACKNOWLEDGMENTS

If you wish to include any acknowledgments in your paper (e.g., to people or funding agencies), please do so using the ‘`acks`’ environment. Note that the text of your acknowledgments will be omitted if you compile your document with the ‘`anonymous`’ option.

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