SUPERCAT

a procedural non-player system for solo Arcs

version 0.3

This is a non-player system, or "bot", for playing the board game Arcs. It's intended for solo play, i.e. one player versus one or more bots. It should also work as the 3rd or 4th opponent in a multiplayer game, but that was not the goal and has not been rigorously tested.

Components

You will need some way to track two numbers per bot, for instance two dice of different colors rotated to show a specific number face up. These are referred to as "counters" in the rules. You will also separately need one six sided die.

Setup

Choose a difficulty mode (see next page) which will determine turn order. For options to play with Leaders and Lore, see the related page at the end of the rules. Then setup the game normally according to the Arcs rulebook.

Playing a chapter

Shuffle the action deck and deal the player 6 cards. Place the remaining cards in a face down stack. Place a counter on each bot's board, with a value of 6. This represents the number of cards in the bot's hand. On the bot's turn, reveal two cards from this stack, and decrement the counter. The bot will play one of these cards, and discard the other. The procedures on the following pages will instruct you on how to select a card, and how to execute the bot's turn.

If at any time the stack runs out, shuffle the discard pile before revealing 2 cards. If at any time the bot gains an action card, place the card near the bot's board, and increment the hand counter. Play card(s) gained as the last card(s) of the round. When the bot seizes initiative, decrement the counter to represent the bot discarding an extra card. Continue until the player has no cards and each bot's hand counter is at zero.

How to follow the procedures

The procedures use some special vocabulary that is specific to SUPERCAT. See the "Terminology" page for explanations of words like **contend**.

Start with "Bot Turn" and follow the instructions, executing statements if possible. When posed with a question, evaluate the situation and follow the nested steps. For more detailed explanation of interpreting nested procedures, see "Questions" at the end of the rules.

When directed, use "General Priorities" to select a card: Lead, Pivot, or Copy with the indicated suit from bot's options. If suit is not available, proceed to next question. Once a card has been selected, go to the page for the selected card's suit.

When multiple actions are available, first spend actions according to highest priority, then if actions remaining, restart the procedure from the top of the page.

Aside from the changes to card play described above, and the additional advantages below, the bot will follow every rule in the game.

Difficulty mode (Optional but recommended)

The procedures attempt to simulate good play, but the bot cannot plan multiple cards ahead nor execute combos using guild abilities. To compensate and make for a more challenging game, start each game with the player last in turn order, and give the bot some additional advantages when it does not have more power than the player:

- **Efficient Logistics**: bot performs 1 extra action per card
- **Elite Pilots**: bot collects 1 extra die during Battle

If the bot is tied with the player, it does not have more power, and will gain these advantages. It's intended that this applies at the start of the game when all power markers are at zero.

Relative power should be evaluated per bot, so in a game with 2 bots, if one bot is ahead of the player, and the other is behind, apply these only to the losing bot. In a multiplayer game, check power between bots and players: grant the bot advantages when it is behind all players.

For an even harder game:

- Apply the above advantages even if the bot is ahead in power.
- The bot with the most power starts every chapter with initiative.

Terminology

claim

open building slot controlled by bot

combat card

any card combined with fuel and a weapon, or an Aggression card. use Aggression procedures to resolve

contend

take an action causing bot to improve its position with respect to an ambition AND bot will be either winning or tied for first or second place. (see "Clarifications")

contested card

court card with bot agents and rival agents, and more rival agents than bot agents

double city

a second loyal city on planet that already has a loyal city

effective

a Vox card is effective if the bot can fully resolve the event (see "Vox Cards")

favorable combat

a series of Move and Battle actions that the bot considers likely to result in a specific goal (see "Combat Doctrine")

new resources

type of resource that bot does not have OR type of planet bot does not have a building on

partial move

a bot Move which does not reach a destination on a single card (see "Movement Doctrine")

task force

group of bot ships with the most fresh ships

unbuilt city

a loyal city on bot's board (not a destroyed city in a rival's trophy area)

unclaimed

system that is not controlled by a rival

uncontested card

court card with no agents

undeclared ambition

ambition that has not been declared yet AND there are markers available

Bot turn (START HERE)

✦ Does bot have no cards left? (check hand counter)

- Pass initiative

✦ Draw 2 cards. Decrement hand counter. Use procedures below to select a card. Then go to the page for selected card's suit and discard the other card.

✦ Does bot have initiative?

- Remove seize counter, if present.
- Is bot winning or tied for first place for a matching **<u>undeclared ambition</u>**?
  - ○ Yes:
    - ▪ Select matching card (if multiple options, select card with more pips).
    - ▪ Declare the ambition.
  - ○ No:
    - ▪ Is bot winning a matching declared ambition and is an ambition marker available?
      - ▪ Select matching card (if multiple options, select card with more pips).
      - ▪ Declare the ambition.
    - ▪ If both cards are the same suit, select card with higher number.
    - ▪ Otherwise, use General Priorities to select card.

✦ Can bot surpass with either card?

- Yes:
  - ○ Select card to surpass.
  - ○ If more than one option, select card with high number.
- No:
  - ○ If seize counter is on bot's board, increment it, else place seize counter, with a value of 1.
  - ○ If hand counter is 2 or greater and initiative was not already seized this round, check for seize:
    - ▪ Roll 1d6, and subtract 1 for each **<u>undeclared ambition</u>** that bot is winning. Seize initiative if result is less than seize counter. Decrement hand counter to represent bot discarding an extra card.
  - ○ Use General Priorities to select card.

General Priorities

✦ Can bot Tax/Secure to **<u>contend</u>** declared ambition? → Administration/Aggression

✦ Can bot **<u>favorable combat</u>** to **<u>contend</u>** declared ambition? → **<u>Combat card</u>**

✦ Does bot have no starport?
- Does bot have a **<u>claim</u>**?
  - ○ Yes: → Construction
  - ○ No: → Mobilization/Aggression

✦ Are any loyal buildings in a system controlled by a rival?
- Can bot Move to change control? → Mobilization/Aggression
- Can bot Build or Repair to change control? → Construction/Administration

✦ Does bot have **<u>unbuilt cities</u>**?
- Does bot have fewer **<u>claims</u>** than **<u>unbuilt cities</u>**?
  - ○ Yes:
    - ▪ Can bot move to get a new **<u>claim</u>**? → Mobilization/Aggression
  - ○ No:
    - ▪ Does bot have at least one **<u>claim</u>**? → Construction

✦ Can bot Tax/Secure to **<u>contend</u> <u>undeclared ambition</u>** or take captives? → Administration/Aggression

✦ Can bot Secure other card or grow a lead in a declared ambition? → Aggression

✦ Can bot Influence **<u>uncontested card</u>**? → Mobilization/Administration

✦ Can bot Influence **<u>contested card</u>** with more agents than rivals? → Mobilization/Administration

✦ Can bot Move to take control of rival building → Mobilization/Aggression

✦ Does bot have ships available to Build? → Construction

✦ Does bot have ships available to Repair? → Administration/Construction

Prelude

Restrictions

Bot will spend resources and guild cards according to these guidelines. If bot is **contending** a declared ambition and spending a resource or guild card will take it out of contention, it will not spend that resource or guild card.

Specifically:
- if tycoon is declared AND bot is **contending** for tycoon then do not spend fuel or material resources or guild cards
- if empath is declared AND bot is **contending** for empath then do not spend psionic resources or guild cards
- if seeker is declared AND bot is **contending** for seeker then do not spend relic resources or guild cards, UNLESS securing another relic card

Resources

Material: spend to Build a starport if none on map, otherwise Build ships

Fuel and Weapon: spend for **Combat card**

Relic: Secure for captives, **contend** a declared ambition, or **effective** Vox card.

Psionic: Tax/Secure to **contend** for a declared ambition, or spend for **Combat card**

Guild cards

Bot will discard some guild card for their prelude effect at the first opportunity.

Bot will discard a Weapon guild card for effect, if it has 3 ships available. Place ships at starport with most fresh ships, otherwise with **task force**.

Bot will discard a Union card for effect. Place action card in bot's play area, and increment bot's hand counter. Play action card as bot's last card.

Administration - Tax | Repair | Influence

✦ Can bot Tax to **<u>contend</u>** a declared ambition?

✦ Can bot Repair ships to change control in a system with a loyal building or take control in a system with a rival building?
- Prefer:
  - Take or neutralize control in a system with a loyal building
  - Take control in a system with a rival building

✦ Can bot Tax a rival city and take captives?

✦ Can bot Influence an **<u>uncontested card</u>** which would **<u>contend</u>** a declared ambition, if Secured?

✦ Can bot Tax to **<u>contend</u>** an **<u>undeclared ambition</u>** or take captives?

✦ Can bot Tax to grow a lead in a declared ambition?

✦ Can bot Influence a **<u>contested card</u>**? (Check "Influence Doctrine")

✦ Can bot Influence an **<u>uncontested card</u>** which would **<u>contend</u>** an **<u>undeclared ambition</u>**, if Secured?

✦ Can bot Influence any other card? (Check "Influence Doctrine")

✦ Can bot Tax for **<u>new resources</u>**?

✦ Can bot Repair any ships or buildings?
- Prefer:
  - ships in **<u>task force</u>**, then other ships
  - starport, if only one on map
  - cities
  - other starports

✦ Can bot Tax for other resources?

Influence Doctrine

When influencing cards in the court, the bot will follow these guidelines.

If possible, influence an **<u>uncontested</u>** card with 2 agents. Otherwise, influence with 1 agent. In other words, if the bot has 2 actions and 2 available agents, and procedures direct the bot to influence an **<u>uncontested</u>** card, bot will spend 2 actions to place 2 agents.

If possible, influence a **<u>contested</u>** card with one more agent than the most rival agents. Otherwise, check if the bot has enough agents: if the bot could influence with agents up to the most rival agents, and still have agents in its supply left over, then influence the card to match rival agents. Otherwise, do not influence the card.

Priorities

When choosing between cards in the court, use the following priorities to select a card.
- Weapon
- Union card or "Call to Action" (Vox card)
- **<u>Effective</u>** Vox card
- Captives
  - i.e. any card where bot could influence with more agents than rival
- Other Vox card
- Icon to grow a lead in a declared ambition
- Loyal card matching outraged resource

If necessary, break ties based on number of keys (choose card with more keys). If same number of keys, choose randomly.

Aggression - Move | Battle

✦ Can bot Secure a card to **contend** a declared ambition, or secure an **effective** Vox card?

✦ Are any systems with a loyal building controlled by a rival?
  - Can bot change control by moving?
    ○ Move to change control

✦ Can bot **favorable combat** to **contend** a declared ambition?
  - Use "Combat Doctrine" to resolve

✦ Can bot **favorable combat** for control in a system with any loyal buildings?
  - Use "Combat Doctrine" to resolve

✦ Are there any **undeclared ambition**s and can bot **favorable combat** for trophies?
  - Use "Combat Doctrine" to resolve

✦ Can bot Secure a card to **contend** an **undeclared ambition**?

✦ Can bot Secure a card to grow a lead in a declared ambition?

✦ Does bot have **unbuilt cities** and fewer **claims** than **unbuilt cities**?
  - Could bot Move to get a new **claim**?
    ○ Move to get new **claims**, until bot has as many **claims** as **unbuilt cities**. Prefer:
      - **new resources**
      - **unclaimed**
      - two slot planets

✦ Can bot take control of a gate adjacent to a loyal starport or rival starport?
  - Prefer: Gate previously controlled by rival, Other gate

✦ Can bot Secure a card to grow a lead in an **undeclared ambition**?

✦ Are there any ships which are not in the **task force**, and not controlling gates or **claims** or rival cities?
  - Concentrate ships towards **task force** (use **partial move**)
  - Move **task force** towards loyal starport if not already at a starport (use **partial move**)

✦ Can bot take control of rival building?

Combat Doctrine

When asked if bot can **favorable combat** to achieve some result, first identify the goal, then refer to the corresponding section below. Goal will always be one of:

- Trophies for warlord
- Raid for resource(s) or card(s) to **contend** an ambition
- Control of a system

Bot will spend resources in prelude to maximize available actions during combat.

Battle is not considered favorable if outrage would cause bot to stop **contending** a declared ambition. Otherwise, Battle risking outrage is favorable if bot could ransack the court.

If bot can re-roll, first re-roll any intercepts, then re-roll blanks.

Trophies

A Battle for trophies is considered favorable if bot has at least 1:1 ratio of fresh ships.

If bot has multiple actions, first roll skirmish dice until ratio of fresh ships is better than 1:1, or only 1 action left. Then roll all assault dice if ratio is better than 1:1, or select half skirmish dice and half assault dice (round in favor of skirmish dice). Allocate hits prioritizing trophies.

Raid

A raid is considered favorable if bot can roll raid dice equal to 2x the number of keys on the target AND bot has better than 1:1 ratio of fresh ships to defender OR has 1:1 ratio AND more than one Battle action available after moving to the target.

If favorable, the bot will first spend actions to roll dice like a trophies Battle, up to the last action available, when it will roll raid dice.

Control

A Battle for control is favorable is bot can roll at least 1 die per fresh defending ship.

If favorable, bot will select dice like a trophies Battle. Bot will allocate hits to take control, then allocate hits to take trophies.

Construction - Build | Repair

✦ Does bot have no starport and a loyal piece at planet with an empty slot?

- Build a starport
- Prefer:
    - at **claim**
    - most loyal ships
    - neutral control
    - least rival ships

✦ Does bot have **unbuilt cities** and at least one **claim**?

- Build cities at **claims**
- Only Build **double city** if winning a declared ambition and uncovering power bonus

✦ Are any loyal buildings controlled by rival, and can bot Build or Repair to change control?

- Build or Repair ships to change control
- Take control if possible

✦ Can bot Build or Repair to take control of rival building?

✦ Can bot Build or Repair to defend any undefended buildings?

- Build or Repair until at least 1 fresh ship defending planets with buildings

✦ Can bot Build ships?

- Prefer: With **task force**, Fresh ships

✦ Can bot Build other starports?

- Prefer: With **task force**, Controlled system

✦ Can bot Repair any ships or buildings?

- Prefer:
    - ships in **task force**, then other ships
    - starport, if only one on map
    - cities
    - other starports

Mobilization - Move | Influence

✦ Are any loyal buildings controlled by a rival?

- Can bot change control by moving?
  - ○ Move to change control (Check "Movement Doctrine")
  - ○ Prefer:
    - ▪ Take control if possible
    - ▪ Neutralize control

✦ Does bot have **unbuilt cities**?

- Does bot have fewer **claims** than **unbuilt cities**, and could bot Move to control any open slots?
  - ○ Move to control open slots, until bot has as many **claims** as **unbuilt cities**. Prefer:
    - ▪ **new resources**
    - ▪ **unclaimed**
    - ▪ two slot planets

✦ Can bot Influence a card?

- Prefer:
  - ○ **uncontested card** to **contend** declared ambition
  - ○ **contested card**
  - ○ **uncontested card** to **contend** undeclared ambition
  - ○ other cards (Check "Influence Doctrine" for priorities)

✦ Can bot change control of a gate?

- Prefer:
  - ○ Take control if possible
  - ○ Adjacent to loyal starport
  - ○ Adjacent to rival starport

✦ Can bot take control of rival building?

✦ Are there any ships which are not in the **task force**, and not controlling gates or **claims** or rival cities?

- Concentrate ships towards **task force** (use **partial move**)
- Move **task force** towards loyal starport if not already at a starport (use **partial move**)

Movement Doctrine

When moving ships, the bot will follow these guidelines.

Each movement has an origin, a destination, and a goal. The procedures will define a specific goal, for example changing control of a system with loyal buildings. The goal will define one or more destinations. The specific destination and origin should be selected according to the priorities below.

In rare cases, the bot will not reach its destination on a single card. These are called **partial moves** and the bot will only make moves like this if explicitly instructed to. In these circumstances, evaluate destinations and goals independently each time the bot plays a card, as the priorities may change on a future movement.

Priorities:

Use **task force** for any moves, if possible. Otherwise, move as many ships as possible, including damaged ships.

When possible, retain control of the origin system. If it's not possible to reach the destination and achieve the goal while retaining control of the origin, check for other origins. If it's not possible to retain control of any origin, abandon control.

If multiple origins and destinations meet above criteria, first choose the shortest path (i.e. spend fewest action). Then, if multiple origins and destinations still eligible, choose randomly.

Vox Cards

The bot will secure a Vox card if it is **<u>effective</u>** or if Securing the card will take captives. A Vox card is **<u>effective</u>** if its event can be fully carried out. The following guidelines explain when a Vox card is **<u>effective</u>** and gives instructions for how to perform the event for the bot.

Mass Uprising

    <u>Effective</u> if the bot has 4 or more ships in its supply. Choose the cluster with the **<u>task force</u>**. If no **<u>task force</u>**, then choose randomly.

Populist Demands

    <u>Effective</u> if the bot is winning or tied for first in an **<u>undeclared</u>** ambition. Choose an ambition the bot is winning, if possible. If only Securing for captives, do not choose an ambition.

Outrage Spreads

    <u>Effective</u> if outrage would cause a player to stop winning a declared ambition. If multiple options, choose whichever resource bot has fewest of. If unable to stop a player from winning an ambition, do not trigger outrage.

Song of Freedom

    <u>Effective</u> if the bot controls a rival city and it's possible to seize the initiative. If not possible to seize the initiative, secure only for captives.

Guild Struggle

    <u>Effective</u> if rivals have any guild cards. Steal a guild card to **<u>contend</u>** a declared ambition or **<u>contend</u>** an undeclared ambition. Otherwise use "Influence Doctrine" priorities to select a card.

Call to Action

    Always **<u>effective</u>**

Leaders and Lore

The bot performs better in "vanilla" games. To keep the procedures streamlined there is only limited support for Leaders and Lore. Here are several options for different styles of solo gaming.

If you don't mind making decisions for the non-player system:

Draft L&L as normal, choosing the most interesting options for yourself and for each bot. When an opportunity arises, override the procedures to take advantage of L&L abilities. This option is good for experimenting with new combinations but requires some mental flexibility and is a less robust solo challenge.

If you prefer the non-player system makes all decisions:

First, randomly assign a Leader to each bot from this list:
- Rebel
- Quartermaster
- Corsair

Then randomly assign a Lore to each bot from this list:
- Seeker Torpedoes
- Railgun Arrays
- Repair Drones
- Signal Breaker
- Mirror Plating

Finally, draw two Leaders and two Lore, and choose one of each for the player.

Questions

Every question should have a yes or no answer. There are four types of questions. Use the following guide if you are confused how to follow the procedures.

Type 1: This type of question will be a single line like this:

Can bot take some action to achieve some goal?

If the bot is able to take the action, following all the rules of the game, to achieve the stated goal, then take the action. If the answer is "no", continue reading to the next section.

Type 2: This type of question will have one nested subsection that is not marked.

Question about the game state?
- *Action to take, or other question to evaluate, if answer to first question was "yes"*

If the answer is "yes", follow the nested procedures. If the answer is "no", then continue reading to the next section.

Type 3: This type of question will have two nested subsections, one marked "yes" and the other marked "no".

Question about the game state?
- *Yes:*
  - *Action to take, or other question to evaluate, if answer to first question was "yes"*
- *No:*
  - *Action to take, or other question to evaluate, if answer to first question was "no"*

If the answer is "yes", continue with subsection marked "yes", otherwise continue with the subsection marked "no".

Type 4: This type of question is only used on the General Priorities page.

Can bot take some action? → Card suit

In this case, if the answer is "yes" AND the bot has a card of the indicated suit available (either one of 2 cards draw, or the lead card to copy), then select that card. Proceed to the page for the selected suit.

Clarifications

The concept of **<u>contending</u>** ambitions is important. This is a special keyword in the context of this non-player system: to **<u>contend</u>** an ambition means take any action which improves the bot's position for that ambition resulting in the bot taking second or first place, including ties.

There is an important difference between **<u>contending</u>** an ambition and "winning or tied for first place", which is that **<u>contending</u>** also includes second place. Note that the bot will only declare an **<u>undeclared ambition</u>** if it is winning or tied for first place; it will not declare an ambition if it is in second place.

Furthermore, the bot will only declare an ambition already declared (i.e. double or triple declare to add second or third marker) if it is winning the ambition. It will not double or triple declare if it is tied for first place.