

BAAADRTS

Welcome to BAAADRTS (Pronounced ba-dirts). A game with loads of pixel art that I spent way too much time on.

My packages are a bit messy because I had trouble working with packages in visual studio code. If you want to locate the main menu class and run it, it is located in src → com → game → game → MainMenu.

Edited Note: The AI is now fixed and fully functional. There are 4 difficulty options

On line 35, 0 means the bot doesnt do anything, 1 means very easy bot, 2 means regular gameplay bot, 3 means inhumanly fast bot

Read below for more details

Main Menu

WHEN YOU BEGIN TO PLAY, BE SURE TO RUN MAIN MENU. the mainmenu class contains the main method that starts up the entire program

The main menu isn't any special, and should be a next step if I had more time. It comes with a few simple instructions and buttons you would need to click through.

The first question it asks is if you would like to play on the forest map, or the volcano map. Honestly, I like the forest map a lot better, but they are both fully functional and perfectly playable.

The second question asks you to adjust the difficulty of the computer opponent. A difficulty of zero means it will not do anything. Increasing the difficulty past this will increase the amount

of moves and the chance of weighing certain moves to be higher. This means that the computer will play both faster and smarter. I recommend not picking insane difficulty, the ai is so much faster and better at decision making than I will ever be

The final question asks if you would like to play, or if you would like the AI to play for you. I thought it was cool to watch the ai play against itself, but for actual gameplay, don't pick it.

BAAADRTs

Hello and welcome to my RTS game without a great name, so I just decided to name it badrts or BAAADRTs. The goal of the game is relatively simple. You spawn in the top left corner of the map, while your opponent spawns on the opposite side of the map with the exact same resources as you do.

You must control your individual units to collect resources, build more units, take over structures, and eventually destroy your opponent's army and castle. While you are doing this, your opponent will be trying to do the same to you.

We will begin by introducing the controls.

As soon as the game begins, you load in with a screen like this.



CAMERA CONTROL

You begin with your castle, 50 gold, and 3 miners standing around. To your top right, there is a timer showing the time of the match. To your top left, you can see the amount of gold you have. To your bottom right, a box for displaying information on your currently selected unit is currently empty. And to your bottom left, a minimap showing the entire map is displayed.

All grassy, stone, and sand tiles are walkable. Water tiles and wall tiles act as impassable terrain you cannot walk into.

The first controls we must learn are to control the camera. By moving your mouse to the edges of your screen, the screen will pan over in that direction.



Here, I panned to the right by a bit. You can do the same for up, left, down, and right.

You can also click and drag the minimap to set your location to where you click on the minimap. This is actually recommended, as it is faster, and often more accurate.

Finally, there are a few special commands. By holding down control, then pressing from f5 to f8, you can save your camera location. By simply tapping it again without holding control, your camera snaps back to that position instantly. Useful for keeping track of barracks.



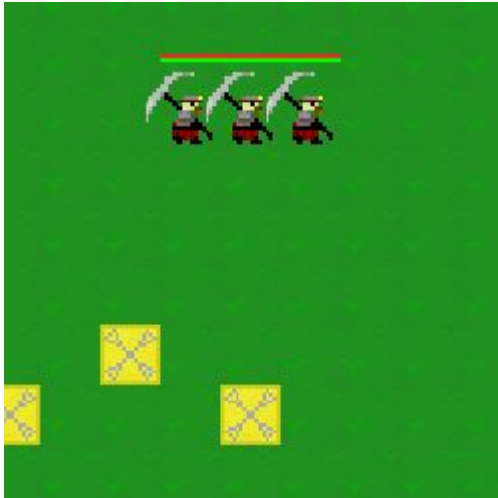
There are saved camera locations, f5 and f6, marked in white. Marked in green, is your current camera position. Tapping either f5 or f6 will snap it back to the white position.

UNIT CONTROL

Next up, we need to learn how to select and control units. Left click, hold, and drag to create a box. Any units underneath the box when you release it are selected. You can tell that units become selected when the information box in the bottom right becomes filled. Now that you have selected your units, right click anywhere to send them to that location. They will walk to that location, then stand there to wait.

You can also choose to press the key A instead of right clicking. This **Attack Moves** them to a location. They walk to the location as normal, but if they encounter an enemy along the way, they will immediately begin attacking them and chasing them.

Finally, there is an attackmove on cursor. **You activate it by holding shift before pressing A to attack move.** If you click a location within the unit's attack range, it will try to attack the target closest to your cursor instead of closest to itself. However, it will fail if there are no units to be found, in which case it behaves exactly the same as pressing A alone.



To begin, we need to establish a way of getting gold, the only resource in this game. In order to do this, we must place a single miner on top of a gold tile. When a miner is on a gold tile, you will earn around 1 gold every 1.25 seconds. TRY TO SPREAD YOUR MINERS OUT. Multiple miners on a single tile do not earn you more money, however, multiple miners on multiple tiles do



These 3 miners are currently providing income as they are standing on gold tiles.

Control groups

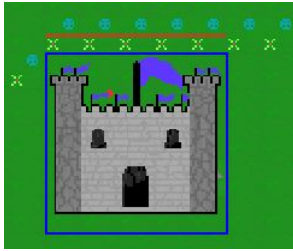
You can create custom groups of units by selecting the group you want, holding control, and pressing a number from 1 to 0 on the top row. Then when you press this number again, any units that were selected at the time you created the group will be instantly selected again, no matter where or what they are.

If you hold shift instead of control, you add the units you currently have selected into the group, instead of overwriting it.

Get creative! Units can be in multiple groups at the same time, and so can buildings. You can save structures inside your groups to train units without even moving your camera to click on the structure!

TRAINING NEW UNITS

To train new units, select your castle. Remember that the friendly castle has blue flags, while the enemy castle has red



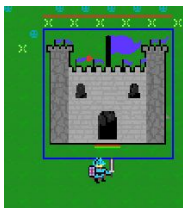
When the castle is selected, you will see a menu pop up in the bottom right.



This shows the units that you are able to train with the amount of gold you currently have. If you do not possess enough gold, the squares are grayed out. To train a certain unit. Simply keep the castle selected, and tap the corresponding key. For example, tapping Z would consume 100 gold, but train 1 single knight. A white bar showing the amount of training time will appear. The knight is trained after the bar is finished.



White Bar ticks down



Knight is trained

UNITS

No other unit other than the miner is able to provide you with income. It is recommended that you at least cover all the gold squares close to your castle to meet a good amount of income. There are additional gold tiles scattered throughout the map.

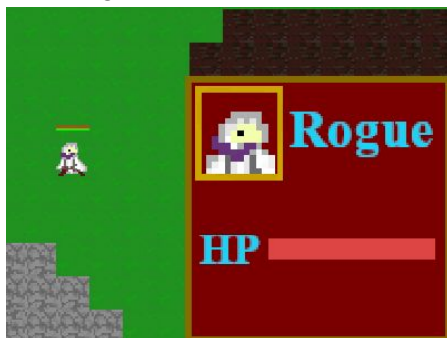
However, despite the mining capabilities of the Miner, they are weak in combat compared to the other classes.



The first unit, the Knight, is a straightforward melee character. He costs 100 gold, has the highest health in the game, and a melee attack where he swings his sword at someone right next to him. While his damage and range are both somewhat mediocre, his high health usually allows him to challenge most enemies in small groups.



The second unit, the archer, is a ranged unit. He attacks at almost double the speed of the knight, but deals less damage per hit, as well as having less than half of the knight's health. The lack of stats are made up for as the archer can attack from over 5 tiles away. Because of this range advantage, large groups of archers can stop enemies before they are even able to make contact with the archers. Combine them with knights to form an effective backline with higher damage.



The third unit, the rogue, is a high damage physical unit. He attacks very slowly, taking a full second and a half to hit a single time. However, his attack is very powerful, able to one shot frail units such as miners and mages, and deal heavy damage to others. When he attacks from a range, he instantly teleports into melee range, catching ranged units off guard. In groups, they are able to quickly wipe out key targets in a single attack. If your opponent has a strong backline of archers, the rogue is able to dismantle a back line. However, they are much weaker than knights in melee combat, and cannot fight head to head.



Finally, the mage is a high damage ranged unit. She also attacks very slowly, but deals heavy damage able to oneshot a miner. The specialty of mages are their ability to take out entire groups of units at once. The mage's attack ignites a 3x3 area, dealing area damage to large groups. A couple of mages can destroy tightly clumped groups of enemies, regardless of number. However, they possess one of the lowest health totals in the game, and can be picked out by assassins if not managed properly.



Miners are capable of combat, just they aren't good at it. Ideally, miners should only be put towards resource collection. However, they do have one special ability that other units do not have. Miners deal bonus damage to structures, such as barracks and the enemy castle. In your final attack to win the game, bringing miners to quickly tear down the castle is in fact a decent idea.

Barracks



The barracks are structures located throughout the map near areas with gold tiles. They begin in a neutral position, where neither team can use them. Instead, the team to first destroy a certain barracks claims the barracks as their own. Once a barracks is claimed, it is able to train troops exactly the same way as a castle



Friendly Barracks and Captured Enemy Barracks.

However, the difference with barracks is that even after they are claimed, they are still attackable by the enemy team. If the enemy destroys it, they can take its ownership from you!

Victory

By out pacing your opponent in terms of resource collection, army product, or in other areas, you can slowly build an advantage in resources. More resources means a stronger army that can push your opponents back. A stronger army means you control more of the map, and more of the map means even more resources. Once you capture barracks and gold tiles in the middle of the map, the advantage that player gains becomes so great the game often is decided. However, true victory is pushing all the way and destroying the other player's castle.

The game does not end however. This is about as far as the work in progress went. The enemy player does not have a way back into the game, but there also is not victory screen. Well. You won! I guess.

Development Keybinds



If you have been fumbling over your keyboard, you might realize you see some numbers in the top right corner. These numbers appear when you press the corresponding key on the numpad. A specifically debug toggle has been turned on. For optimal enjoyment of the game, the only ones that should be on are 6, as they show the health bars, and 9, which mutes the music.

They are as follows

Numpad(1): Show the integer value of each tile on the map (Creates a grid too)

Numpad(2): Shows the flow field that is used to path find the units. Keep in mind only the player makes use of the flowfield

Numpad(3): Toggles hitboxes. When it is on, you will see a purple box marking your mouse, and black boxes around any entity

Numpad(4): Shows the intended path any unit is attempting to take.

Numpad(5): Shows the number of units from each team on any given tile

Numpad(6): Toggles Healthbars on and off.

Numpad(7): Infinite money, and allows you to control enemy units. Simply tapping zxcvb now spawns the corresponding unit at the location of your cursor for free. Holding control and tapping zxcvb allows you to summon an enemy version of that unit

Numpad(8): Shows the status of gold tiles, and the amount of friendly and enemy miners on top of them.

Numpad(9): Mutes the music.

Esc: Pauses the game

Those outlined in green can be used in normal gameplay. Those highlighted in blue are used for testing purposes, and can be quite distracting for gameplay. However, I do believe it is cool to look at and experiment with

Finally, those highlighted in red basically grant you a godmode. Turns the game into a sandbox game and yeah.

Numpad8, which is not highlighted, literally has so little effect on the game I forgot what the button did myself.

THE AI

The game features an ai, a computer controlled player that moves units around in an attempt to outpace you. The AI is left to perform one single action every 2 seconds, a somewhat slow pace for a human, but the ai will never missclick. Its current code makes use of a priorityqueue of commands, objects with a command, delay, and weight. Depending on the state of the game, different actions will have different weights. They are thrown into the priority queue, with a bit of randomness, and played back in order of highest priority to lowest priority.

For example, usually, producing workers is a medium-high priority, so the bot will mainly focus on producing workers in the early game. However, when the castle is under attack, defending the castle becomes a much higher priority. The high priority item is added to the priority queue, delaying the production of units until later.

The AI will also attempt to fight you when its forces are stronger than yours, and take small random moves to cover more areas of the map every once in a while. When

constructing its own army, it will take the size of your army, along with the size of its own army and its available resources into consideration.

It doesn't play perfectly, as it doesn't exactly target any key important targets, such as mages, or play for objectives, such as barracks. However, its ability to keep up its income and produce an army is surprisingly quick. Tied in with a bit of randomness, it is almost impossible to predict and guess the ai's behaviour.

~~The problem is however, the ai is prone to using a lot of memory, and sometimes crashes java. However, it should run fine for a few minutes, and might be able to pull off an impressively large army.~~

I LIED THE AI WORKS GREAT NOW AND IT DESTROYED ME ITS JUST A BETTER PLAYER THAN ME.

A-Bot

Will absolutely carry you.

When starting the game, you can select Abot to play for you. A-Bot, or ally bot, is an improved version of the enemy ai, with a few additional rules to its decision making, such as better managing miners and better targeting. It also operates faster than the opponent. By pressing the **end** key, you toggle A-Bot on and off. When A-Bot is active, you see this little drawing in the bottom right. ABot also disables any of your inputs while it is active, except for moving the camera and toggling debug keys.



A BOT ABSOLUTELY CARRIES ME BECAUSE IM BAD AT MY OWN GAME

Next steps

The main menu select is absolutely less than impressive. I wasn't able to figure out how to create a nice, working menu, so this placeholder one is here to stay.

Some of the audio effects also do not function because java does not work well with audio files not in .wav format. They were ultimately removed.

If this is a project I continue to work on, I would absolutely love to continue working on the AI's decision making. It is interesting to be able to take in a complicated game state, and without a thinking human brain, be able to choose moves that result in advantageous outcomes.

Finally, I was never able to get multiplayer working. I was limited by my knowledge of how networking works with java, and I could never get multiplayer working without a significant amount of lag, delay, and desyncing. If i have the opportunity to try again with multiplayer, I would definitely like to.