Decision Tree Application for Choosing Job in Ragnarok Mobile

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Abstract—**Tree is very useful for not only programmers but everyone for tree can be implemented into many things and simplify many problems. For an example we used tree in our Algoritma and Struktur Data's assignment. It was used for the recipe tree. Not only for programming purposes, tree can also be used to simplify everyday problems and also gaming problems. Choosing jobs is one of the hardest parts in playing RPG games for if we chose the wrong jobs and it turns out that it doesn't suit us, we can end up getting bored easily. Therefore, we have to be very careful in choosing the right job for some RPG games need some time to delete a character. For an example Ragnarok Mobile needs about 24 hours to delete a character and it's a waste of time for we can use that much time for farming dan leveling.**

Keywords—**Graph, Rooted Tree, Decision Tree, Jobs**

I. INTRODUCTION

Graph is a structure that shows the relation between one thing and another. It was used for the first time by Leonhard Euler to solve the Konigsberg Bridge. Graph have two main components, namely nodes and edges. Edges are usually represented by a line that connect two nodes or more, while nodes are represented by a dot or a circle. Each node represents an object and each edge represents the connection between one object and another.

Graph is now being used for many purposes, like in computer programs. For an example it's used in our assignment for Algoritma dan Struktur Data to connect one room and another. But sometimes it can also be used for solving everyday problems, like separating chemical stuff that can't be put together in the same room.

Tree is an undirected graph. Graph could connect two nodes with more than one edge, but tree couldn't. Every node in tree is connected by one edge. Tree has some types that we can use for different uses. One of them is Rooted tree, it can be used for solving many problems, one of them is sorting numbers.

Decision tree is one of rooted tree's implementation. Simply put, it's used for choosing one thing from another. For an example, it can be used to sort numbers. And here it's used for choosing from one job and another.
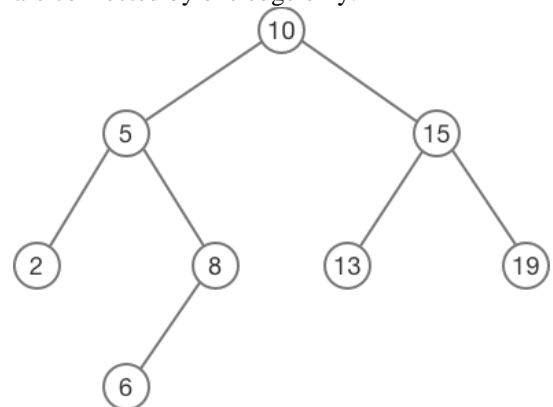
II. DEFINITIONS AND EXAMPLES

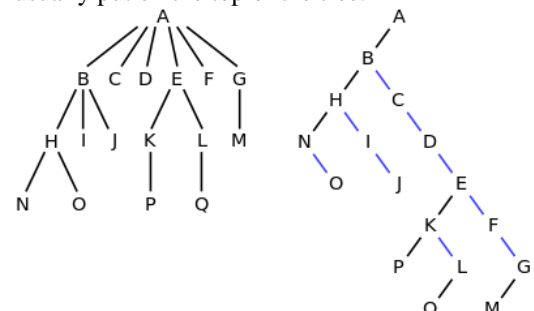1. Graph: A structure that shows relation between one thing and another.
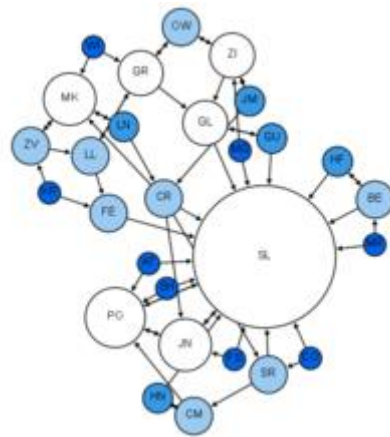
Graph theory in sociology: Moreno Sociogram (1953)

2. Tree: An undirected and simple graph. Nodes in tree are connected by one edge only.
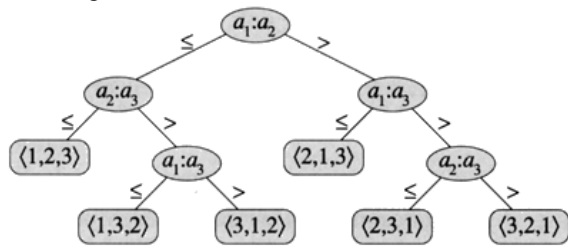

Sumber: https://brilliant.org/wiki/binary-search-trees/

3. Rooted tree: A tree that have one node as the root and usually put on the top of the tree.

4. Decision tree: A rooted tree that's used for choosing one thing from one another.

III. ROOTED TREE TERMINOLOGY

1. Child: in the picture above, a2:a3 is the child of a1:a2
2. Parent: in the picture above, a1:a2 is the parent of a1:a2.
3. Path: the path from a1:a2 to a1:a3 is a1:a2, a2:a3, and a1:a3. The length of the path is 2. So the formula for the length of the path is n-1. For n is number of nodes that's in the path.
4. Descendant: if a node is located on the same tree with the other nodes, then we can say that they're whether the descendant or the ancestor. <1,3,2> is the descendant of a2:a3.
5. Ancestor: a2:a3 is the ancestor of <1,3,2>
6. Sibling: if two nodes have the same parent then they're sibling. <1,3,2> is the sibling of <3,1,2>
7. Subtree: if one tree is a part of the other bigger tree. For an example a1:a3, <1,3,2>, <3,1,2> is the subtree of the whole tree above
8. Degree: is the sum of a node's child
9. Leaf: nodes with 0 degree
10. Internal nodes: nodes with non-zero degree
11. Level: the number of edges that's used for reaching this particular node
12. Height or Depth: is the maximum level of a tree. For an example in the tree above, its maximum level is 3.

IV. RAGNAROK JOBS EXPLANATION

Ragnarok has 6 starter jobs, they are Thief, Swordsman, Merchant, Acolyte, Mage, and Archer. We can change into this job when we turn into level 10 or above, we can change it in a place called Adventurers League HQ. And after the six jobs above it can change into more advance jobs. The next job advancement can only happen if the starter job has reach level 40.

First, we're all started as an Adventurer, we don't have any special skills when we're an Adventurer. Then, we have to level up until there's a quest that will guide us into changing our job. When we're in the Adventurers League HQ there will be 6 NPCs

(Non-Playing Characters) that represent every starter job.

There's Durta that represent Mage, Kebak that represent Archer, Ysmir that represent Thief, Toukyou that represents Swordsman, Laiyinasi that represents Acolyte and Gunther that represents Merchant. They'll provide us with all the information we need to know about the job and they will ask if we want to change into that job or not.

Thief is a DPS (Damage per Second) type. This means that thief will be the damage dealer in the team. It will only use a melee weapon such as dagger and sword. Its best feature is its agility and strength. Every time its agility went up, its attack speed will go up too. Therefore, if you're playing as a thief, your screen will be full of damage output number. But it's very fragile for most player won't be focusing on vitality and defense. The job advancement you could take after this job is Assassin and Rogue. Assassin can only use melee weapon and can deal a huge damage for it can easily produce big critical while Rogue on the other hand is a lot more versatile and specialized on poison attack for it can use bow as its main weapon. Assassin is really good on Player vs Player mode, that's why it's the most popular job in Ragnarok.
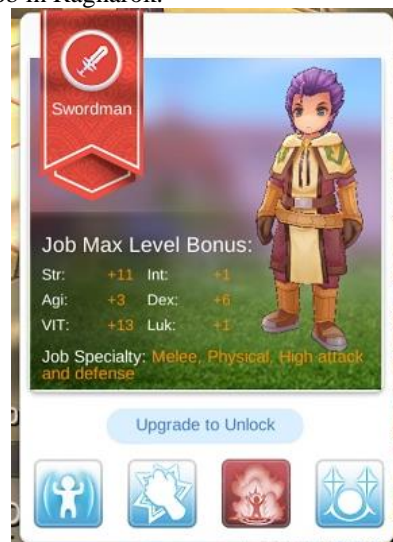
Swordsman is a Tanker type. This means that in a party, swordsman will mostly take all the damage from the enemy. Its best feature is its defense and vitality. Most of the time it won't deal much damage for most player will only focus on vitality

and defense first. But sometimes there were player that's also focusing on strength. After having Swordsman level 40, it can turn into Knight or Crusader. Knight is the offensive tanker for most people usually focus on strength, agility, and dexterity. Knight is the only job in Ragnarok that can ride a mount and it will make Knight one of the fastest job in Ragnarok. On the other hand Crusader is the all about defense for it doesn't have many attacking skills. Crusader is one of the toughest job in Ragnarok and it's really useful for Boss/MVP hunting.

Sumber:https://id.gamefever.co/2018/10/22/guide-untuk-job-merchant-ragnarok-m-eternal-love-sea/

Merchant is a Farmer type. This means that this job can make a lot of money. This job is very unique for it has a skill called Discount. This skill could make it sell something at a higher price than usual and it could buy something below market price. On the contrary, it doesn't have any decent fighting features, its damage and defense are low. Therefore, it's only suitable for farming. After taking Merchant until level 40, it can change into Alchemist or Blacksmith. Alchemist is focusing on making potion, both for offensive purpose or for defensive purpose. Alchemist is pretty versatile in the fight for it has a lot of potion variation. While Blacksmith is focusing on crafting equipment and on making a lot of money.

Sumber:https://id.gamefever.co/2018/10/22/guide-untuk-job-acolyte-ragnarok-m-eternal-love-sea/

Acolyte is a Healer type. This means that this job is a support in the battlefield, it will not only support by healing but also the buffer. Buff is some kind of extra stats. This job is very useful for partying for it's the only job that can heal and buff others. Its best feature is its healing and buffing skill. But it has a very low damage output. The job advancement of acolyte is very unique for it can turn from the healer type into damage type. The damage type is called Monk. It has a really high DPS, almost similar to assassin, and its weapons usually has a very high attack. But, there's also an option for an advance healer, it's called Priest.

Mage is a Magical Damage type. This means that it will damage monster and other player with magical attack. It has the highest damage output among other classes. Its best feature is its skill when it's combined with dexterity stats. Every time the dexterity stats went up, the casting-time of Mage's skills will be reduced. But it has a low defense, that's why in Player versus Player people will tend to attack Mages first. Just like Swordsman, Mages also have offensive and defensive Mage. The offensive one is called Wizard and it has the highest damage output among other classes in Ragnarok and Wizard is very versatile and it has a lot of combo option, from fire earth, water wind, and all round. The defensive one is called Sage. While Wizard can only cast spell while standing still, Sage can cast spell while moving and it can come in handy in a lot of fights.
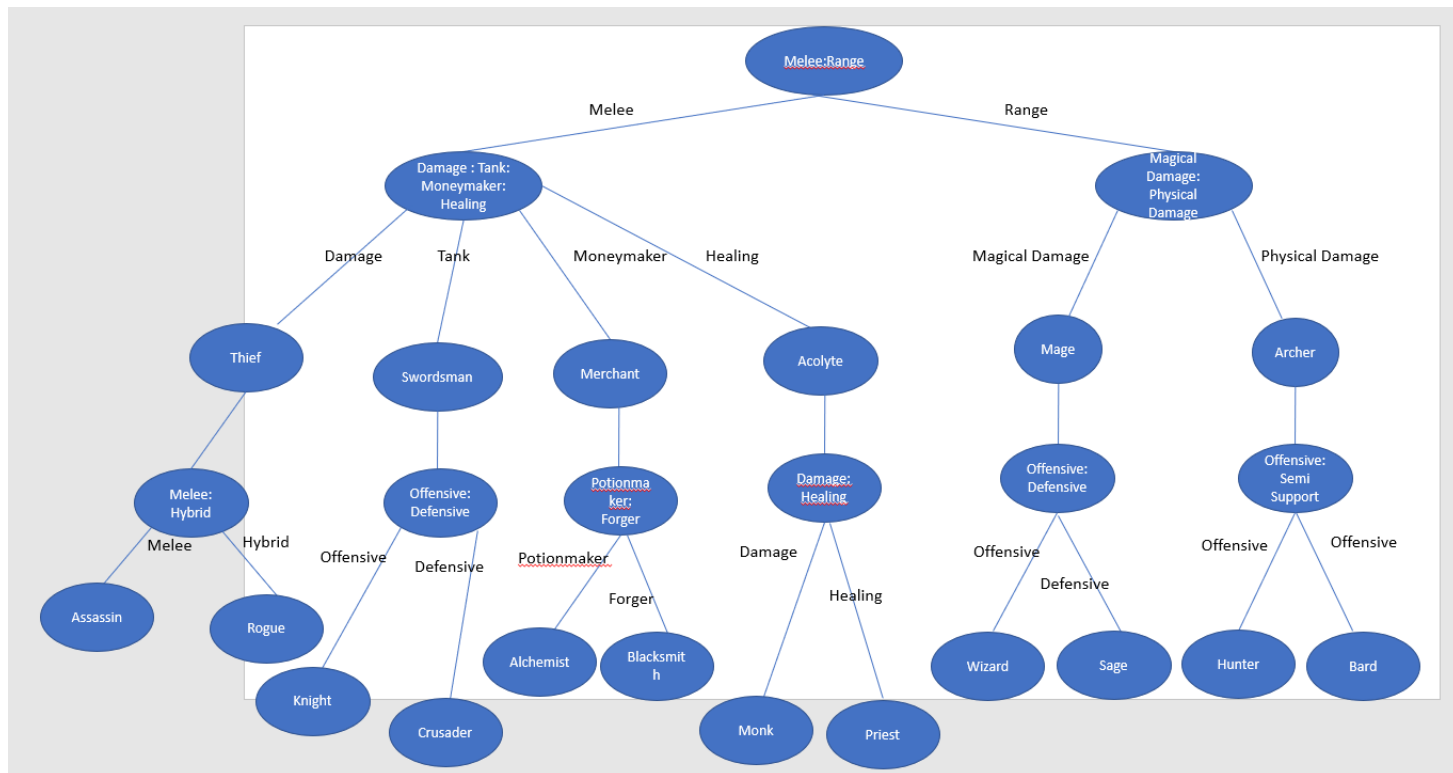

Sumber:https://id.gamefever.co/2018/10/22/archer-guide-ragnarok-m-eternal-love-sea/

And the last one is Archer, it's a DPS type. It means that Archer will be the damage dealer in the team. Archer is quite

unique for its damage output will increase when the dexterity stats went up. Dexterity will make the player's accuracy went up, therefore Archer will have a high damage while its attack will rarely miss. But it doesn't have a high defense and can't evade any attacks. After reaching Archer level 40, you could turn into Hunter or Bard. Hunter is the offensive one and it can easily farm monster a lot faster than other jobs in Ragnarok while Bard is a semi-support, it means that it supports other players with some buff while it can also deal a decent damage.

IV. JOB DECISION TREE EXPLANATION

This is how to use the Job Decision Tree.
1. We decide how we want to play, do we want to attack the enemy from a close range or a long range,
   a. If we decided to play from a close range then we start considering the specialty of each job,
      i. If we chose to be the DPS of the team then we should choose Thief,
         1. If we chose Thief, then we should consider the second job advancement, do we want to attack enemy from a close range or be a versatile one (can attack from both close and long range),
            a. If we decided to attack from close range then we should choose Assassin for the second job advancement,
            b. If we decided to

attack from both close and long range then we should choose Rogue for the second job advancement,
   ii. If we decided to be the tanker of the team then we should choose Swordsman,
      1. If we choose Swordsman, then we should consider how we want to play the next job advancement. Do we want to play as the pure tanker or an offensive one,
         a. If we chose to be the pure tanker then we should choose Crusade for the second job advancement.
         b. If we chose to be the offensive tanker then we should choose Knight for the second job advancement.
   iii. If we chose to be the moneymaker or in "Zenymaker" in Ragnarok then we should choose Merchant,
      1. If we chose Merchant, then we should consider the next job advancement, do we want to be the potionmaker or a

forger,

      a. If we chose to be a potionmaker then we should choose Alchemist for the second job advancement.

      b. If we chose to be a forger then we should choose Blacksmith for the second job advancement.

iv. If we chose to be the Healer then we should choose Acolyte,

  1. If we chose Acolyte, then we should start considering the next job advancement, do we want to keep being a Healer or turn into a DPS,

      a. If we chose to keep being a healer, then we should choose priest.

      b. If we chose to turn into DPS, then we should choose Monk.

b. If we chose to play from a long range then we should how do we want to attack the enemy, with magical damage or physical damage,

i. If we chose magical damage, then we should choose Mage,

  1. If we chose Mage, then we should start considering the next job advancement, do we want to be an offensive Mage or defensive one,

      a. If we chose to be the offensive one, then we should choose Wizard for the next job advancement.

      b. If we chose to be the defensive one, then we should choose Sage for the next job advancement.

ii. If we chose physical damage, then we should choose Archer,

  1. If we chose Archer, then we should start considering the next job advancement, do we want to be the full offensive or a semi-support,

      a. If we chose to be the full offensive, then we should choose Hunter.

      b. If we chose to be the semi-support, then we should choose Bard.

V. Conclusion

Tree is a very useful tools, not only for programming but also for everyday uses. Tree has many forms and one of them is Rooted Tree. The one we're using on this paper is one of Rooted Tree, it's called Decision Tree.

Decision Tree can help us by comparing one thing to another and finally giving us the best option needed. One of the things that Decision Tree can help us with, is helping us to choose which job is the most suitable for us in Ragnarok Mobile.

This Decision Tree can help many newbie players who are unfamiliar with Ragnarok's jobs for it's very complex and its jobs is very unique. Therefore, the player must choose wisely between one job or another for job is the most important thing in Ragnarok.

VI. Acknowledgment

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