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Journal --What I learnt?

Monday:

Q1: Evolution--Keep changing and give chances to adjust to the new situation.

Some may be better→ better and better→ live

Some may be bad→ extinct

Example: no feather →feather

Trial and error-- Tested again and again. If it's useless, it will be thrown away.

Some may be just mistaken (because no one can find its usefulness).

--unlucky and thrown away wrongly

Some may be really useless and can't fit the situation well.

Example: Assumptions→Experiments to text→ empirical formula

> Exciting and enjoyable.
>
> Start thinking.

Q2-4: Evolve

--Why?   To adjust to the new situation/ desires

--How?   New combination/ Invent/ New ways to use

--When?   By accident/ After selected/ Big changes of environment/ new things or theory discovered

Tuesday

Q1: the Important properties of evolution

a) The changes of population;

b) Selection;

c) Rules(cooperate/ defect→different result);

d) The changes of the situation(such as environment);

e) Fitness;

> I like the games.
>
> →understand it better!
>
> Python--ok, but a little hard.

Q2: see evolution as more complex than Monday when we showed Linux example?

Yes! Prisoner's Dilemma is a good example. Learn:

a) Complex but with something in common;

b) A lot of examples in our daily life if you try to discover them and think about them deeply;

c) Able to be studied deeply after adding different things following different rules. (simple→complex→fantastic results --evolution also keeps going like this)

d) Theory is useful if you can find out their connections and how to use it.

Wednesday

Q1: How does more information on biological evolution extend your understanding of evolution?

a) Gem: I. --good ⟺ --bad
   If the situation change, they positions also change.
   Like: forest ←→ desert.
   II. one(1)+one(2)→new one;

b) Topic--a good way to practice and learnt more.
   --My topic is The Origin of Feather. There are still so many thing I don't, but I did have fun in learning new things.

   Challenge myself → wonderful experience.

> Ask myself questions and discuss with others!

Q2: Do you have more examples of <u>evolutionary process</u> now?

a) Language
b) Program
c) Clock:

China: → use the shadow under the sun
       → the gravity of water
       → the animal (especially the rooster)
       → machines ⟶ →no electricity
                    →electricity ⟶ →using spring
                                   →battery (many kinds, such as quartz watch)
                                   →solar power

d) Weapon

Thursday

1. **About the game of mating:**

   a) Information is very important! ———— X-ray look
      --make good use of what you get and show yourself as well
   b) Selection according to the traits and personal tastes;
   c) Active→ more chances;
   d) Fitness--gem value; eggs; etc.

2. **About the evolution:** (something new to learn)

   a) Not perfect;
   b) May have no reason;
   c) Different way to achieve it;

Thanks! :)

Jessie 陈冠宇

2013.5.10

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陈剑安

陈剑安

Joel

jian (wan

CHEN

Monday:

Evolutions are everywhere.

Systems also have evolutions, like the linux system. It's open-sourced

and everyone can change it. It can change into many directions and they

may not be combined if they have many differences. It's just like the

species in animal evolution.

There are many new techniques today. Many of them may originate

from one thing, such as single chip. Different apps in the single chip have

different functions.

Everything in our world is changeable. If we don't like something, we

can try to figure out some ways to change it.

When we make a programm, we should try to simplify the code. Then

find the connection between each variable, list the logic relations. We'll

find it more easy.

Tuesday:

The game: good strategies stay , bad strategies die out

Nature: Animals which have the skills to get used to the environment

have more opportunities to live and more offspring. Those who lack of

the skills may extinct, so the species evolve.

Computer system: The systems which are more convenient and easy to

use favor people, the arithmetic which use the advanced strategies take

the place of others.

Wednesday:

Game: In the forest brown insects survive better while in the desert the

white survives better.

Natural selection depends on the habitat.

Inheritance:

Some individuals have variations that will give them a slight advantage in

the struggle and their offspring inherit their gens. Overtime the

character of the species will change.

Thursday:

Sexual selection:

Nature: Female will choose male according to their appearance or gens.

But gens often can't be seen, so there are many features that matters.

Females tend to choose the males with good gens. Males will compete

with each other to court females.

Thoughts: When we make a programme, we can choose many

algorithms. But some are better than others. Algorithms are also

evolved.

WRAP UP:

Evolutions are everywhere in the world. What we can do is to see the evolutions around us. We can find the examples in the nature and use them in our computer programmes.

Journal

day 1:

evolution = the way we move may be years ago we don't
our feet, we may swim, jump, claw, climb trees
but later, our feet became more useful on the land so long
we have feet, we don't swim or climbing

that: In the example of evolution, we may swim to climb
It is that.
error = But mostly, In ocean, It's very dangerous. so who
error = But mostly in the sea may die. it's not error.
swam in the sea may

things want to survive and became better, stronger, they evolve
worse the. And It's becoming better and better. This is how
After that many trials and errors, the better the evolve the
things evolve.
when "nature" is changing, things are not better enough.

Ben.

Day 2:
Properties = population, "strategy", about teaching better. Inheritance
Properties = population = strategy, about teaching better. Inheritance in nature.
Yes, some evolutions are complex than this. example in nature.
Yes, some evolutions are complex system. Like me, man, the
organisms is are very complex system. Like me, man, the
colour of our skin, our eyes is simple. But behind this, are
have a lot of complex things. like genes
on these things is in biologist. Biologist is complex.

Day 3: Evolution is not just a simple produces. In biological
evolution, there are co-evolution. Evolutionary inform matters.
before I just knew evolution is about becoming better
students adapte to the teaching is also evolution.
evolution of everywhere, biology, scientist, eating...

Day 4: the game let me realize: 1. evolution is
powerful, change the world
2. but also has some regular things, make it better
and better.

Above all, I have known the teaching section method.
And know why you are not teaching us programming.
because I always complained about that before
Tand wonder.

Pan Conglian 潘丛连

SHANTOU UNIVERSITY

Course Day 1.

1. Evolution is close to change, but has some differences. When something evolves, it not only changes but generally becomes more prepare to the environment and becomes better.

2. "Trail and error" means you Try to find the answer and study from mistakes. "Evolution" means you are processing, and maybe "Trail and error" helps to make evolution.

3. Things evolves because nothing is stable all the time like the mutations of genes. Maybe it's the rule of nature that keeps things changing. But still, some external factors will push things to evolve the external factors may be the environment, selection or any thing. When a man-made thing appears, it will change while spreading because human beings always have thoughts their own and they are going to change things to fit their thoughts.

4. Things change slightly, but with a the accumulation of changes, it may become a totally different one after some time.

5. Evolution can happen in any time any where. If there is no evolution, there will be no improvement.

Day 2.
1. Evolution happens in biological world. as well as in society.
You may decide to cooperate or defeat to get the most benefit.

2. The game we played tonight shows some complex situation in the prisoner dilemma, and the strategies looks just like different behaviors in society. In the real world. not only nature but also society. relationships are much more complicated than the theory.

Day 3.
1. If we want to understand one thing better. we should try to find the history. The ancestor or the origin of the thing. Fossil is a good history recorder of evolution and it gives us historical information, and it shows that evolution happens in several ways.

2. Think about the game we played last night, we may change the strategies a little to simulate the variation of genes, and that will become more complex but ~~more~~ closer to the real world.

Day 4

1. Genes have qualities. Some may cause a better appearance, which can make the living creator stronger than others, and can attract the opposite sex and mate, which helps to pass the genes to next generation.

2. Though the mate selection can be complex both ~~in biolog~~ among animals and human beings, the general result is that the good genes can be passed on, and finally a the species will get stronger.

Chebur.

Liu guan yang

BLUE.

I learn Evolutionary System

I am very interested in programming. Thought I fail to be a formal student of this class because of my poor english,I still feel happy to have the opportunity to join the class Evolutionary System as a auditor.

What is Evolution? Evolution in nature is a lot of animals live together in a limited spare with a limited resource. When the resource can not carry so many live, the stronger one will survive and the weaker one will die, and then the next generation can carry a stronger gene and have more fitness to the environment. As the time goes by, the last generation will change a lot comparing with the original one.

Selection is the rule of the evolution. If you are stronger, then you survive. If you are the weaker one, your gene will became harder to pass to the next generation. And then the number of your gene in the next generation decrease, which seems that the nature select the gene.

Evolution is in every where. No matter how big the whale is or how small the bacteria are ,there is competition,there is the evolution.

Let's think, if it can bring the earth stronger animals, why can't it bring a better solution in the program? It also can give us a way to get the better solution toward a complex problem in the computer programming. We can build a model first, then assume a lot of way to solute the problem. We can try our strategy one by one, pick several bad strategy away, and then go on to check our good strategy one by one again and again. In this way, we can find a best way to solute the problem. And this is the evolutionary prosses and system.

What's more,the class impressed me deeply in the way of teaching. When I was still in primary school, I usually heard that the way of teaching in the west country is very different from ours., now I see it with my own eye -- we learn from work, while they learn play.

The night of Tuesday, teachers told us to play the game Prisoner's Dilemma. Teachers wanted to show some example relative to the evolution of nature. But they did not bring any heavy book to let us read as what our teacher usually do.They just gave us several cards, told us the rules. It take a long time to make us understand how to run the game, but the game appealed to us very much. We listen very carefully. So it did work, we can easily accept the knowledge because it is funny.

I learned a lot in this week. Evolutionary System is a way to deal with the problem in the computer. It can select a better solution from all the strategy. Computer can help us to get the better strategy by using a Evolutionary System.

Rainy 〈飘飘沙沙〉

May 6th, 2013   Monday

Today is the first day of the course about evolutionary processes and systems. Starting with an example of Linux, Doctor Una-May and Doctor Erik tried to explained the evolution of computering science. I think I can try to understand this "new" kind of evolution with the knowledge of biology.

- **What is the difference between evolution and trial and error? Examples of each.**

Evolution is the result of successful changes, which means those species fit the environment better so that they can live, like chameleon.

Trial and error refers to those changes but fail in the end, cause their changes are weak so that they can't be adaptive to the environment, like mammoth.

- **Why do things evolve?**

Evolution does not have any objective in mind. Evolution is a natural process. Environment changes as time goes by, and

nothing is perfect to keep path with the changes of environment, so evolution is to make species better and fitter to live in the nature.

● When do things evolve?

I think evolution always happens, without stopping.

May 7th, 2013   Tuesday

Through the example of different 9 strategies, I think that evolution is not only random, but also needs luck (environment) and the opponents and partners you meet. However, to be fit to the change of environment is the key to live.

May 8th, 2013   Wednesday

● What are important properties of evolution?

1. To create new species, I mean reproduction isolation.

2. To adapt to the environment.

● Do you see evolution as more complex than Monday when we showed Linux example?

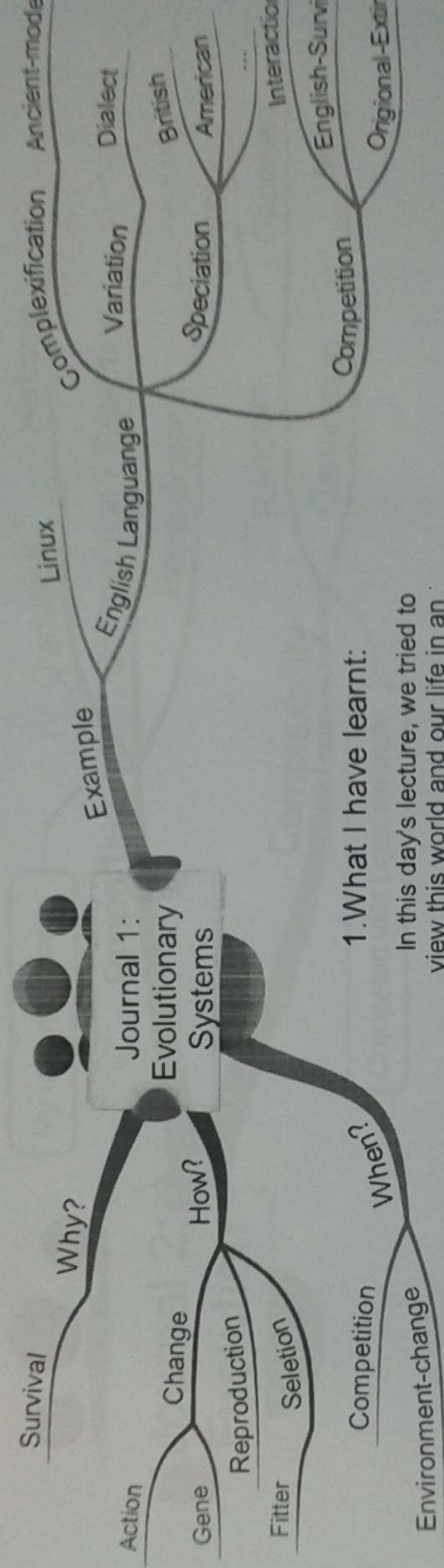Besides the examples in biology, I prefer to make music

as an example.

```
   ( Notes and rhythms )  ⟹  ( melody )
                              ⬇
              ( Classical , rock and
                  roll, jazz, blue )
```
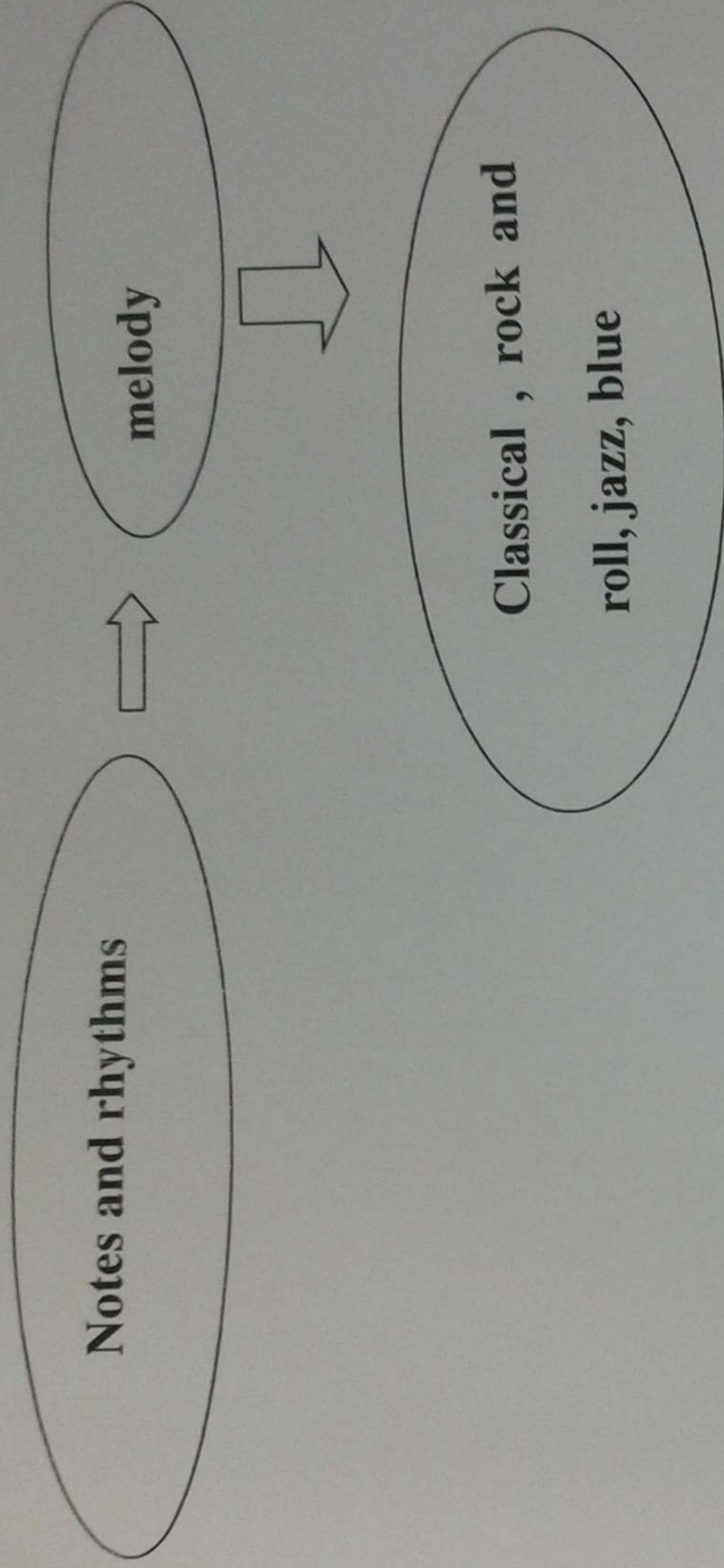
May 9th, 2013   Thursday

Mating is the only way to pass genes from parents to their offspring. In most of cases, female prefer prefer those males stronger, healthier, which reflect those male are fitter and their genes are better. Meanwhile, in order to pass their genes, males have to show themselves, just like in the game, clapping and singing and the number of teeth, those are to attract females and convince females that they're the right one to mate. So the evolution is to make creatures better to live, or to make their ways of living fit to the environment.

Evolutionary Processes and Systems-Journal 1

Journal 1: Evolutionary Systems

Why?
- Survival
- Action
- Gene
- Change
- Reproduction
- Fitter
- Seletion

How?
- Competition
- When?
- Environment-change

Example
- Linux
- English Languange
  - Complexification
    - Ancient-mode
  - Variation
    - Dialect
    - British
    - American
  - Speciation
    - Interaction
  - Competition
    - English-Surv
    - Orgional-Ext

1. What I have learnt:

In this day's lecture, we tried to view this world and our life in an evolutionary perspective and got to know about Python.

2. What would I have done differently:

I should have learned some knowledge of Python before this course and been more active in class.

3. What should my instructors do differently:

It was a really interesting class and I did enjoy a brand new learning style. I think our instructors was great.

Evolutionary Processes and Systems-Journal 2

Journal 2: Evolution

My understanding

Properties
- Variation
- Heritable
- Competition / Selection
- Reproduction
- Strategy
  - Random
  - Opponent
  - Many
  - Generation

Complexbility

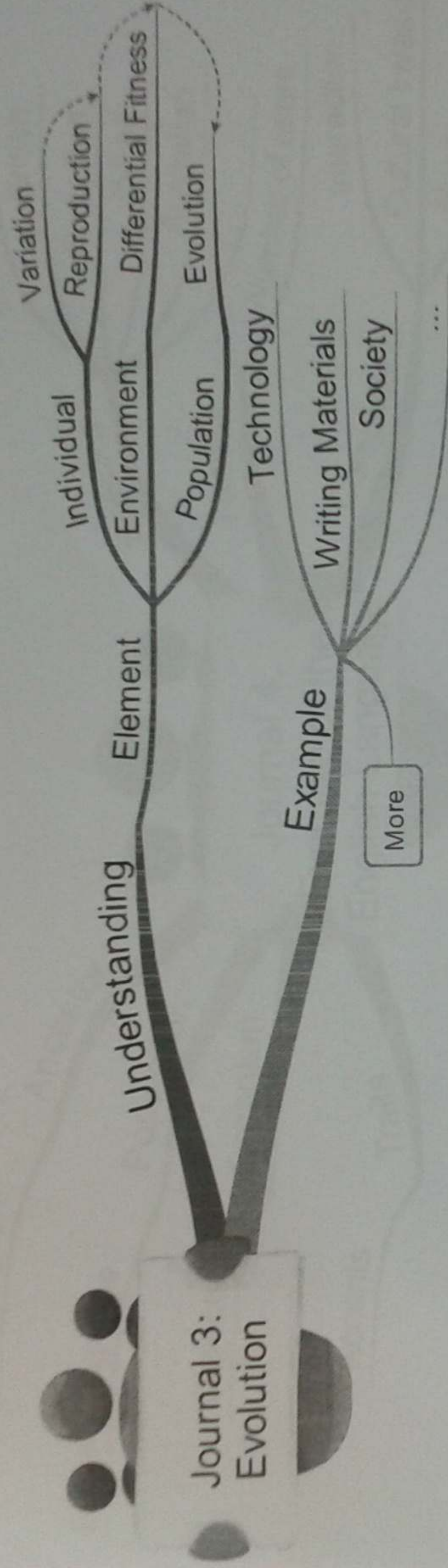Compared with Linux example
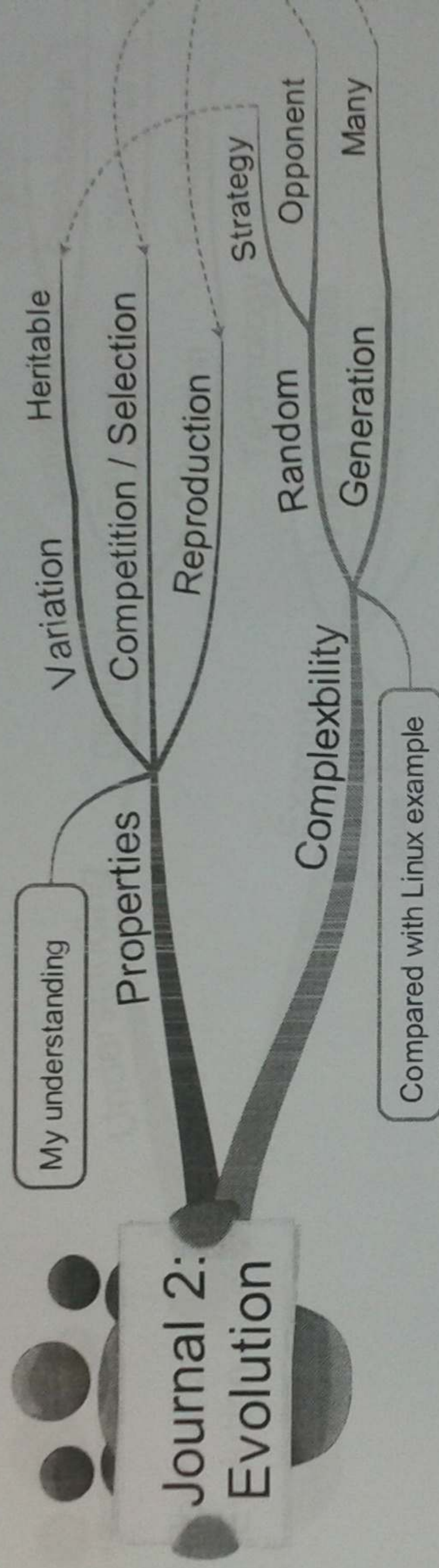
1. What I have learnt?

In this lab, we played the game Prisoner's Dilemma in a more complex way, relating this process with evolution. And in the task, we also knew more about Python.

2. What would I have done differently?

Like the formal day, I think I should have become more active in the interaction in class. That is very important in ACTIVE LEARNING.

Evolutionary Processes and Systems-Journal 3

Journal 3: Evolution

- Understanding — Element
  - Individual
    - Variation
    - Reproduction
    - Differential Fitness
  - Environment
  - Population
  - Evolution
- Example
  - Technology
  - Writing Materials
  - Society
  - ...

More

1. What I have learnt:

In this lecture, the abundance of cases of biological evolution make us more clear about the process of evolution in other systems. And in the office hour, with the Help of Erik, we looked at the structure of the EVO_PD code and discussed how to optimise the flexibility and readability in programming.

2. What would I have done differently:

I would have read the teaching plan more carefully, and have a look in Darwin's *The Origin of Species*. That would promise a more thorough understanding of this subject when we were through the gems together.

Evolutionary Processes and Systems-Journal 4

Ancient English

Ancestor

English language

Population

Dialects

Organism

Accents

Traits

Journal 4: Example of the English Language

Species
- American
- British
- Canadian
- Indian
- Australian

Fitness
- ...
- Number of users

Competition
- Interaction
- Cultural Invasion
- Number of users
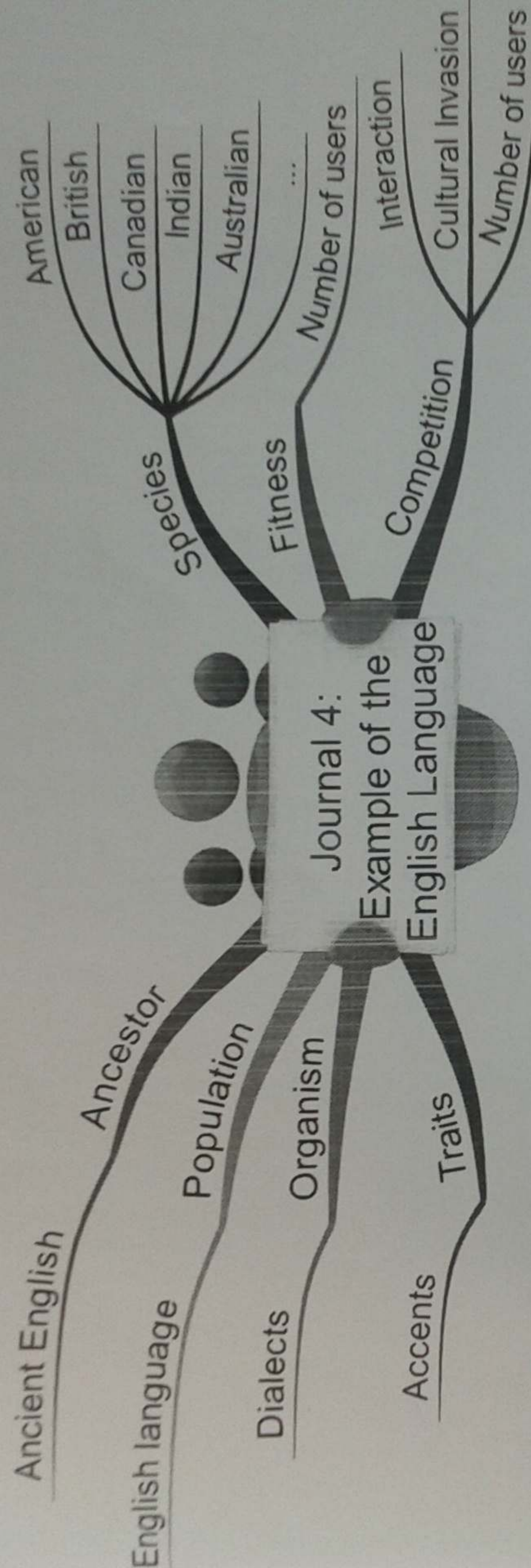
1. What I have learnt?

In this lab, we looked into sexual selection in a very interesting way. In the game, we got more clear about the mechanism of sexual selection in evolution. We also took a small look at the Evolutionary Algorithm, and thought about the mechanism of taking lessons from nature to find optimal solutions.

2. What would I have done differently?

I should have been more active in the game. "If I want to do well in academy, I need to be passionate about what I am doing and learning."

姓名 Patricia

Day 1:

• what do have learn:

① Active learning = thinking individually → pair and combine best answer → share with class.

② The glamour of the Linux. d have google it.

③ Knowing how evolution is related with computer science by learning how Linux develop.

• what would d have done differently?

Learn to thinking independently, don't afraid of m- aking mistakes. because there is no wrong answer, it just not perfect.

• what should my instructors do differently?

① Dr. Uma - May: sometimes d can't realize what you want to tell us. some words are too professional, maybe more tips you give can help us have a better understanding.

② Dr. Erik: what you have express me is that when you talking about the assignment. You read the PD for us. Maybe it will be better if you just tell us what to do and show us an example. instead of reading it to us.

Day 2:

• What I have learn?

① I finish 2 tasks, but something wrong happen while I show it to doctor Una-May.

② The important properties of evolution are compare, compare with the or origin, it got some change, and this kind of change can the be inherited.

③ Of course, the evolution of the nature are far more complex than others, it is a long time with all kinds of complex process.
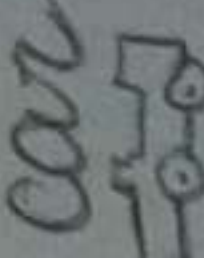
④ We know need various species.

Day 3:

• How does more information on biological evolution extend your understanding of evolution?

Makes me more interest in evolution, and just tell me little, let my curiosity guide me to search it, discover it.

• Example of evolutionary process: The car we drive, the clothes we wear, the shoe we buy things.

Even the ant under your shoes are evolve.

car — beautiful shape — top
     — colorful — comfortable seats

sport car — drive more fast
train truck — smooth skin
...... and so on.

Day 7 : the last journal :

. Review the questions on the first day. we got diff
erent answers. it prove that we acquire something.

. Evolution make world better instead of perfect.

○ Dr. Una-May: I think you are very inquire,
and know how to teach on the first day.
when I ask help for you, you ask me look
several questions. I feel very unuummeel
to your teaching way. but then. I underst-
and that is teaching. teaching student how
to think instead of think for her/him. But
fewer question when the student meet you at
first time please. it's really no easy for us to
answer so many questions. that make me feel afraid.

○ Dr. Erik: I don't know why that you make
me feel that you are a little shy. you are
patient. while explain the PD to us. you said
a lot of things. which cost you nearly 3?
minutes. but it seems like that we still
know nothing. maybe you can tell us how
to study it instead of what all that mean.
showing us.

武 什 佳

Weiss

Journals

Day1: Today, we start to learn about evolution. There is a little different from what we had lean in our senior high school. Today we know that evolution not only happen in biology, but also on many things around our daily life like Linux operate system, cars, cellphones, language....After, we start to learn python, It's similar to the C language we lean last term. But it's more flexible and pithy. The code is not so easy to understand. so after class, I have to search something about the python on the internet and after communicate with the classmates, I learn the basic use of it. We are used to study with the paper, so it would easier for us to learn python if our instructor give us mini-textbook about python.

Day2: Today I learn Evolving NIPD Strategies through games. There are 9 strategies, and we finally find that H "Hard Majority" is the best strategies although it's not the best choice in this games. It's also a kind of evolution, the strategies is changing all

the time and make it more fitness to survive. And we see that evolution as more complex than Linux example.

Day3: Today we learn more about evolution through many biology examples. Evolution means the process by which different kinds of living organisms are thought to have developed and diversified from earlier forms during the history of the earth. That is similar to Darwin's evolution Theory. Species is change slightly over the time. Those individuals have advantage variations tend to survive better and leave more offspring. And the Offspring tend to inherit the variations of their parents. That call the "Natural Selection", one of the important part of nature evolution.

Day4: Today we learn more detail about the evolution. One of the example is sexual selection. The female choose their sexual partner in order to find a stronger male to produce a strong vitality offspring. Because a stronger male are more likely carry advantage variations. And their offspring who

inherit their better variations are more likely to survive and leave more offspring. We learn all these knowledge by doing it.That's different from our traditional education. I think that is a better choice because we can make study more interesting and effective. That's one of the thing that expand my worldviews. And I like that !

Evolutionary Processes and Systems

Pilot Learning Module

Year 1, May 2013

Journal   Alan

May 6th, Monday

e.g.

Evolution: shoes (different kinds of shoes: sport (football, basketball,

running, etc.), high heel,

sandal

different material: leather, canvas, plastic, etc.)

Trial and Error: try use steel to make a pair of shoes but finally find out

that it's too heave to walk, so it doesn't work.

Evolution finally goes to the better things but trial and error goes to the

worse things or no improvement.

Things want to be better, things want to be more adaptable to the

surrounding, things want to suit different kinds of requirement so they

evolve. Evolve bases on the original and try to make some changes and

improvements so that species can get close to the required target.

Species evolve when the environment change. Things evolve when

people find that their function is not good enough and can be better.

May 7th, TUESDAY

Important properties: Evolution contains loops, inheritance, variation, innovation and die out.

The evolutionary process we have seen today is more detail and reasonable than Monday. Through the NIPD game, I find that evolution is full of trials and errors.

May 8th, Wednesday

Through the simulating game and some other example of Darwin's Theory, I knew that the tendency of biological evolution is always control by the environment. For instance, sea is more dangerous and has more challenges than the river or steam. So the big fish is more likely to survive than the small one in the sea. Gradually, sea fishes evolve to be the big fishes. And other evolutionary processes are also similar. The tendency depends on the requirement of people, like shoes. Running shoes, people want to be more comfortable, so the shoes become lighter and softer. Basketball shoes, players want to get more protection, so the shoes add more and more air cushion. Actually, the process is not as simple as I said, but when we look back to the ancestor now, it's not hard to get some conclusion like this.

May 9th, Thursday

Tonight, I was so happy that I got the information of the evolutionary algorithm and I knew what evolutionary algorithm use for. (Also I know what Dr. Una-May and Dr. Erik are working for.) It dismissed most of my

confusions which existed before the class or even bigger on Monday, Tuesday, and Wednesday. Besides, I thought the game was so fun and also useful for me to experience and understand the sexual selection.

From the final diary, I want to tell you my feeling through these few days' classes and also give you some suggestions that might help you to improve the course. Firstly, I really like this active learning style, which is so different from the education style I have got before. The two labs amazed me a lot, learning a theory by playing a simulating game is a very good strategy, because it won't be so boring and we can also learn it profoundly. But I think there are something can be better. As for me, there're many new words in the class, sometimes I couldn't make sense but I was hesitated to interrupt you and ask the meaning. So I hope that you can give me outline or syllabus before the class each time. It can not only let us build up the big picture of next class, but also be familiar with kinds of scientific words through reading something material. In addition, I think the office hour can be more efficient. Sometimes I am not so active to ask question but only try to do the work by myself. But after office hour on Wednesday night, I think asking questions or discussing is much better. I prefer to have discussion in office hour and then work out the problem in dorm, but because of the shy or something else, I wasted some chances. So I hope I can be bold and active next time.

And finally, thank you for your teaching!

Journals

- Hello,Professors.

  I'm Harry,a guy who always want to do something differently.That's

  a 'diffferent' self-introduction,right?Just kidding.OK,here are some

  thoughts about lectures.

The first day:

What i learned:

- The deeper meaning of evolutionary:everything in the world is

  changing for better and better,if you don't run faster then you will die

- Evolutionary exists in every corner in the world.If you did not see

  them,live more carefully

Some advice for you:

- Doc.Erik is too fast,but it was not your fault.So,I think you should add

  some pauses at the end of every sentence.

The 2rd day:

Learned:

- Through the game,it became easier for me to understand what

  happens to genes while evolution occurred

Advice:

- In the office hour ,you seemed to be late for ten minutes.Punctuality

can increase your credibility and reputation among students.

- Before you describe the game in details,please tell us the rules briefly.That will help students be familiar with the new game.

Day3:

Learned:

- You describe the the same process between programming and nature evolution :updating and 'complete-survive-develop'.But I think it can't do much help in our programming skills before we write enough amounts of codes.All we can do is just remember the idea without experiencing them.

Advice:

- Don't waste too much time in explaining.We are more good at guessing the function of your tools.

The day before the last day:

Learned:

- Today,I really realized the connection with evolution and programming:We can learn the ways to solve the problems and the spirits to make things better!

Advice:

- To be honest,I am not so interested in programming,but we all like

your lessons,really(Not because your candies~).When can we meet

you again?

Lastly,I want to thank you for teaching us the vital module in your

theory ,because I had a dream that I want to go to MIT and listen to those

masters.You achieve my dreams!Thank you again! However, in the mean

time,I feel so sorry that I have nothing in return but best wishes.

School: Shantou University

Major: Mathematics

Name: Nicole (真佳泽)

Evolution Processes and Systems

Pilot Learning Module

Journal

- Journal entry 1:

1. Difference between evolution and trial and error

Evolution: Something can change and become better to for survival.

    Something new appears.

    (e.g. The evolution of the bird)

Trial and error: Trying out various things until error is satisfactorily reduced or

    eliminated. There is no new thing and change.

    (e.g. Change variable values when the debugger is stopped.)

2. Take Mathematics theories as an evolutional example

(1) Why do things evolve?

  (a) There are many different theories.

  (b) All theories come from simple and basic calculation method and geometrical form.

  (c) Some theories can be changed. People revise it or make it complete.

  (d) They can be extinct (no one is interested in it or no practical significance).

  (e) Theories can be developed.

(2) How do things evolve?

  (a) People study the theories.

  (b) Theories are spread.

  (c) People create new theories.

  (d) Theories are developed for the realistic problem

(3) When do things evolve?

Started with "natural number"

- Journal entry 2

1. Important properties

  (a) Species is variable

  (b) Common ancestry

  (c) Natural selection

  (d) Gradualism

2. More complex

  (a) Individuals are different too!

  (b) Memory

  (c) Competition

- Journal entry 3
1. New understanding of evolution
   (a) Some species survive while some die off.
   (b) Dominant and recessive (some can be seen while some can be invisible)
   (c) Selection (because of environment)
   (d) Inheritance
   (e) A new species
   (f) Gems from habitats (e.g. natural selection in speciation)

2. Examples of evolutionary process
   (a) Languages compete. (e.g. The complex languages die out.)
   (b) Adaptation (e.g. People adapt a new environment.)
   (c) Cooperate (e.g. Bacteria and trees help each other.)

- Journal entry 4
1. New example of evolution: Chinese Character
   (a) Many different styles of Chinese character, such as Song typeface, cursive handwriting.
   (b) Different styles of character compete with other. The styles of character which are easier to write and remember will win.
   (c) There are variations between people' writing styles.
   (d) The character came from the character ancestry. (Maybe the simple picture)
   (e) Selection (In different times, people have different popular writing styles.)
   (f) The style of Chinese character can be change.
   (g) People can make a new style of character.
   (h) The style of character can inherit the older style but change a little.

2. My Reflection
   (a) A new learning style (Think-Pair-share) is good!
       We can have our own thought and think deeper by discussed in pair and learn more ideas by shared with others.
   (b) The style of "Learn it and do it" is great!
       The learning process is interesting and exciting. We all can join the games.
   (c) The evolution is very powerful and smart.
       The natural selection can select the complex organisms in many ways.
   (d) There are many evolutionary examples around us.
       For example, there are language, character and transportation.
   (e) I am trying to expand my worldview.
       The world seems more interesting after learning the evolution.

3. My Questions
   (a) Could you explain more about the connection with evolution and computer science?
   (b) How to use the evolution to find a solution? Could you give an example?

Journal

11通信 苏伟俊 Weijun Su

Monday:

1.revisit the content:

- Introduction to the course and instructors
- Outline of evolution with the history of evolution's history and the examples of Linux System
- Prisoner's Dilemma and simple programming which simulate the process

2.answers to the questions:

What is the difference between evolution and trial and error?

From my point of view, along time ,with the trials being selected again and again ,errors will be going extinct ,and the evolution happens after this process,evolution happens.

Examples of each

I can take whales as example. The ancestor of whales are land living creatures. With the environment changing ,for surviving on earth, they evolved into the modern whales which live in the ocean.

Why do things evolve?

Because the environment change or the resources are limited, which lead to a competition or selection to the population.

How do things evolve?

The fit ones tend to survive or pass the selection while the unfit ones gradually die out.In other words, the gene frequency of the fit ones gradually increase and the unfit ones decrease.

When do things evolve?

When things vary quite a lot from the original one. Biologically, when a new universal traits occur to a creature, and they could not breed with the original one, things have evolved.

Tuesday:

Lab day:

1.Do the Dilemma Programming

2.Extension of the Dilemma: play the game in a certain population,each person has his/her strategy and play the game with different opponents and find the fittest strategy.

My summary: after selection ,the frequency of fit strategy tend to increase along time.

3.Answers to the questions

- What are important properties of evolution?

The evolution can help find the fittest strategy.

- Do you see evolution as more complex than Monday when we showed Linux example?

Yes, from the aspect of evolution, and the games we play today, the Linux system is improving through the evolution. Because we can change the Linux and the Linux is evolving, the unfit version of Linux go extinct and the efficient version go further .And compared to the original system, it is improved and it is fitter.

Wednesday:

- Evolutionary gems
- More scientific details about evolution: variation of individuals, some traits are unfit and bad for surviving, which let their genetic frequency in the population decrease. Some fit traits passed on to the next generation and increase their genetic frequency.

Answers to the questions:

How does more information on biological evolution extend your understanding of evolution?

Firstly, the biological evolution can be seen directly and clearly. It is easy for us to tell their difference and whether they are fit or not. From the biological process, it is easier to find the rules, and see the evolutionary system.

Do you have more examples of evolutionary process now?

Yes. From the biological world, everything are evolving. Fishes, whales, giraffes ,etc. Language, technology, culture, music ,etc.

Thursday:

- Additional to evolution: Sexual selection
- Play mating game which indicate the how the sexual selection work
- Explain the purpose of learning evolution: use the module to solve complex problem, eg .random design, evaluate ,selection, keep the fit ones ,vary it, and evaluate……finally got a fit design.

- Answers to the questions:

What is the population?

Take the whales in for example. The whole whales are the population.

What is the organism?

Each whales or is the organism.

What is the traits?

I take the ancestor of whales for example. The shape of their limbs can be the traits.

Was the traits fit or not? And How?

Shapes that is good for swimming is fit. Because the hunter on land is much more than in ocean. Better swimming skills ~~tend to~~ make them ~~easier to~~ survive more easily.

What is their ancestor?

~~Their~~ They may have landing ancestors.

My summary to this course:

From this course, I have got more familiar with the evolution. Before the class, from my point of view, everything in the world which are changeable are evolving ,and it is only natural phenomenon. In other words, when two conditions has been fulfilled, evolution happens: one is the stuff is changeable, and the change can be passed on.for example, biologically the creature can breed and their traits can be pass on. And the traits of next generation can be changed. This is the precondition of evolution. Another is the selection, if there are no selection, things can not evolve, because no traits will die out. This principle apply to everything around us. I knew this when I was in high school and I think that is all of it. After the course, I learned that we can build the evolution systems to solve some complex problem. How great it is. In fact, a lot of problems, we only know how to evaluate or how to select, and the solutions are of the great numbers. We can not use the mathematical ways to help us figure out which solution can work best. Then we can simulate the evolutionary process to find out the fittest one, which can solve the problem. This idea amazes me.

So, from the course, I learned the following things:

- Simply use Python to programming
- Have distinct look on the evolution theory
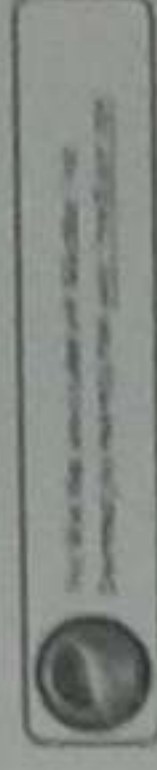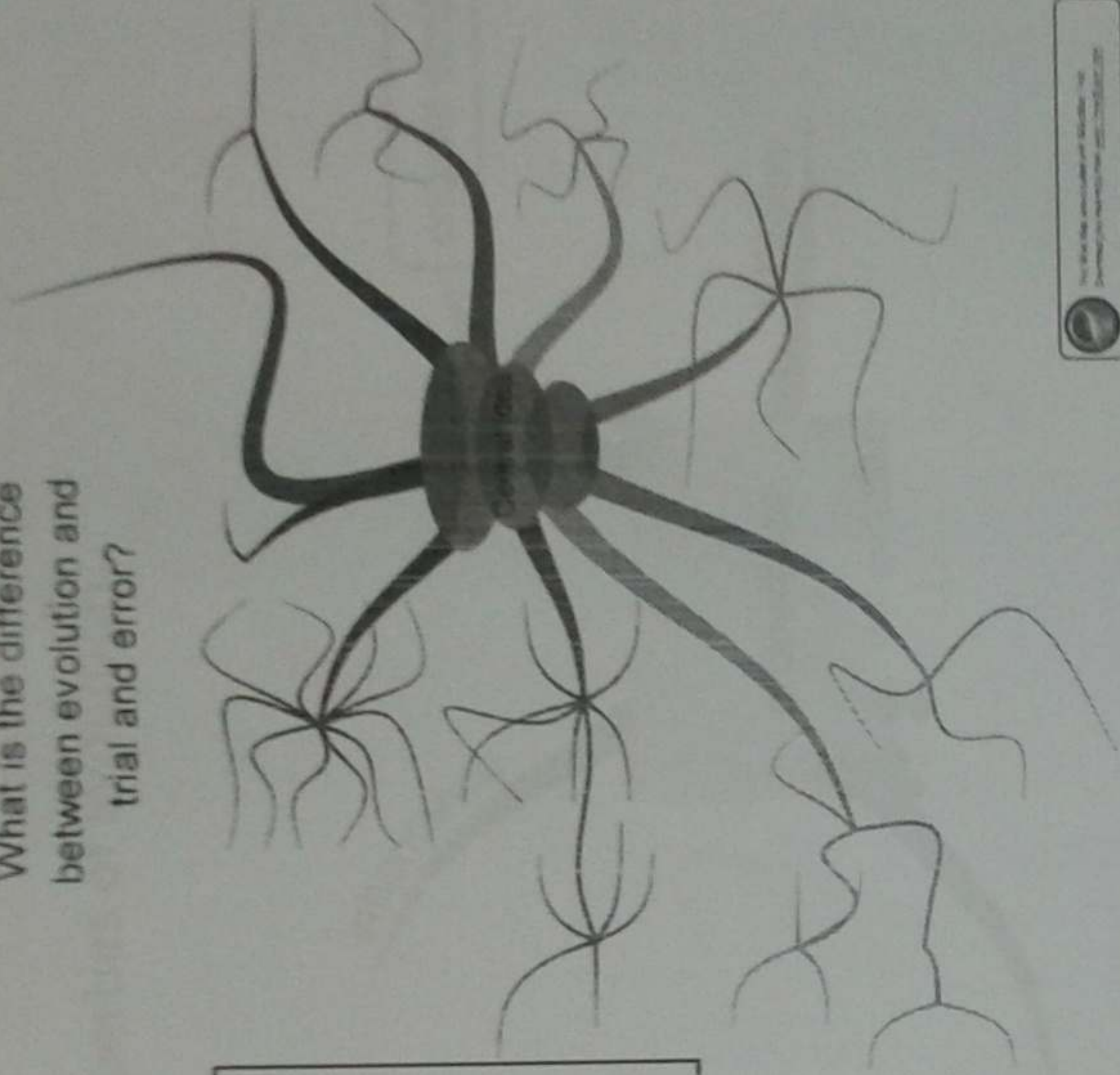- Know how to use the evolution system to solve problem

From Jessie, 刘美丽

Journal 1 -- Monday

What is the difference between evolution and trial and error?

All the picture calls evolution.Every branch can be thought as one trial.Nature likes a griddle,some trials can give you right size,others will be errors.

• Why, How and When do things evolve?

Because nature says: hey! My role is "the fittest will survive,the weakest will dead".When I think so,I fell unhappy,just like a toy.

We can simulate evolution in our life,then,maybe our nature is also a simulation by other high-intelligent life.

• As we all know,Erik spoke too fast.
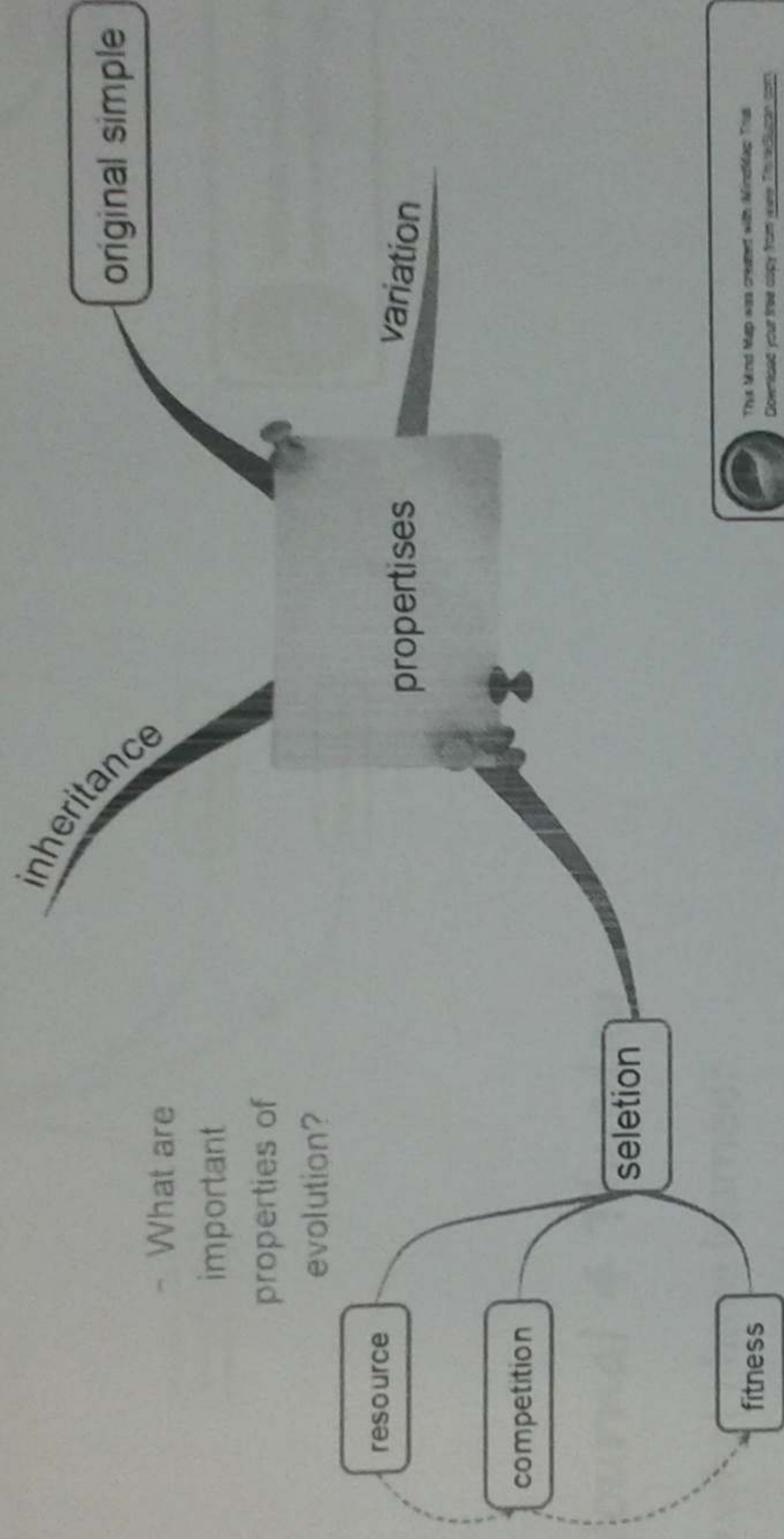
Journal 2 Tuesday

• what I have learned?

I'm so happy to do the game. In my mind,I have never do games likes this in class.

What's more important,when I learn the program of EVO_NIPD.PY,I

find every move can be finded in the game.

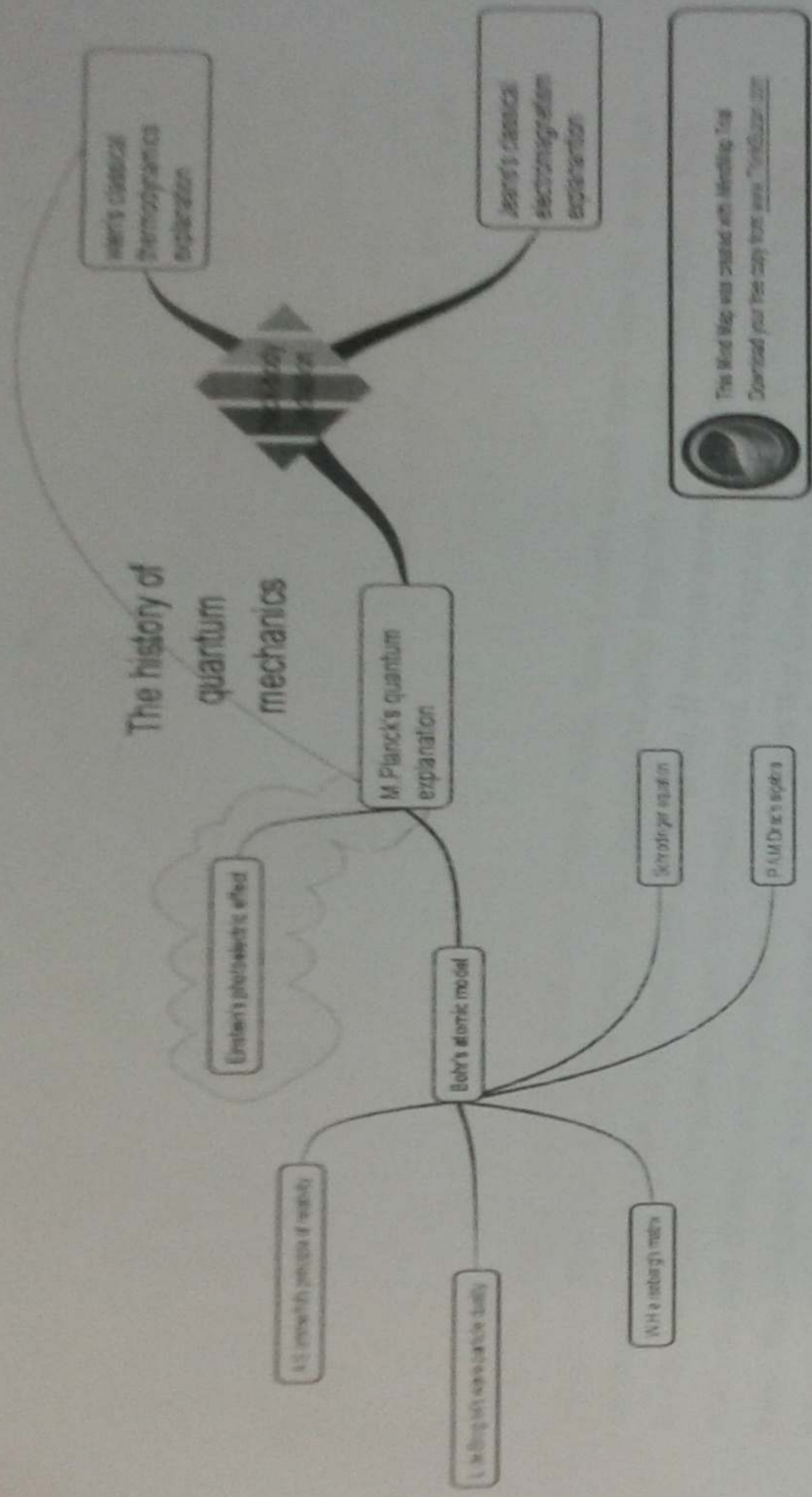PERFECT!

- What are important properties of evolution?

- Now,evolution become complex, more generations, longer time,

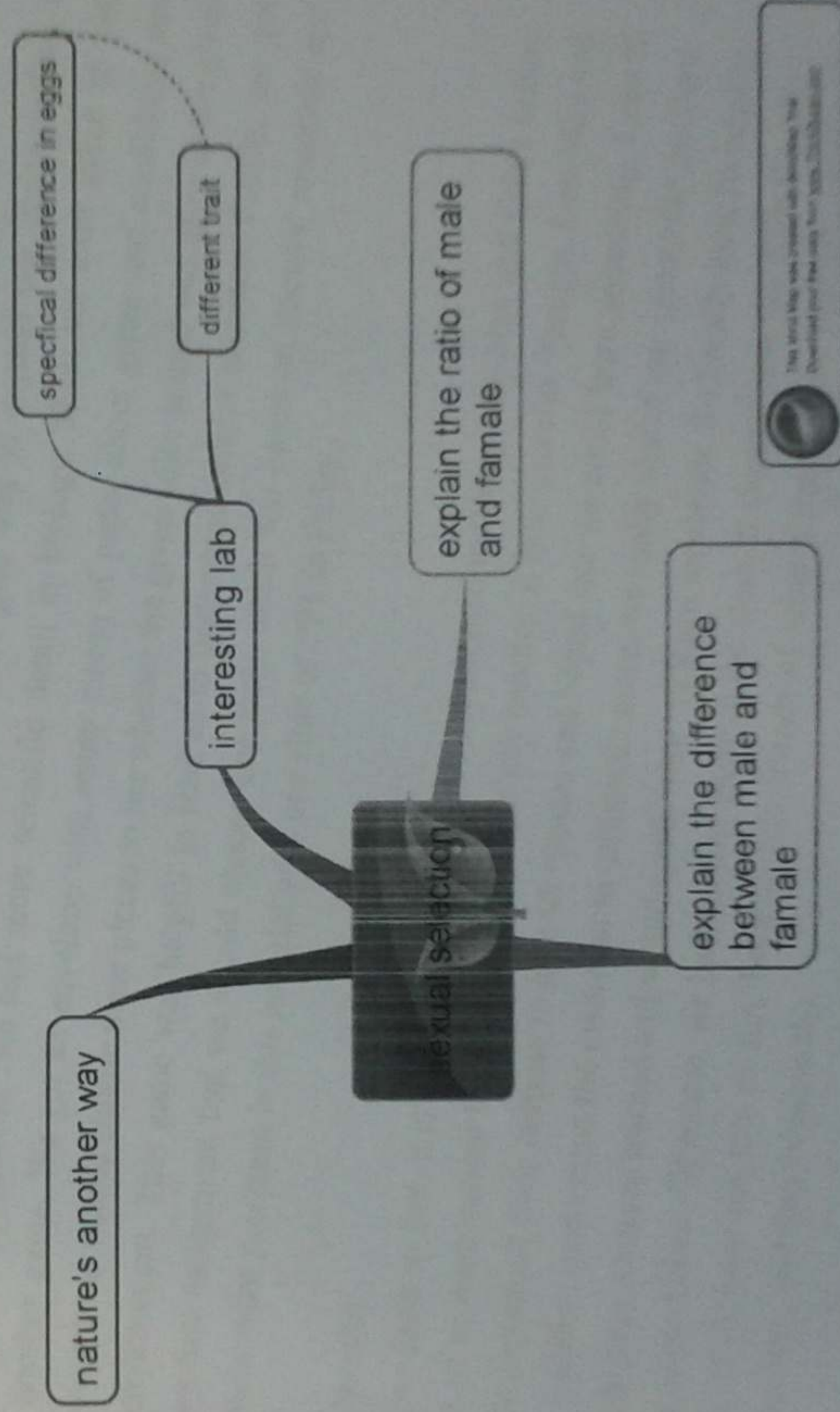andom and indeterminacy. Then ,the big bang happens.

Journal 3 Wends

- I think there are too many biology today.I have learnt these

concepts before.

- Do you have more examples of evolutionary process now?

I find that the history of quantum mechanicsit's a good example to

show evoluation.

The history of quantum mechanics

- Heat's classical thermodynamics explanation
- Jeans's classical electromagnetism explanation
- M Planck's quantum explanation
- Einstein's photoelectric effect
- Bohr's atomic model
- Schrödinger equation
- P.M Dirac's system
- L.E Einstein's principle of relativity
- L de Broglie's wave-particle duality
- N.H e rydbergh matrix

Journal 4 Thusday

- what I have learned?

sexual selection

- nature's another way
- interesting lab
  - specifical difference in eggs
  - different trait
- explain the ratio of male and famale
- explain the difference between male and famale

- what would I have done differently?

I need to think and ask question.

Reflection about evolution

(Leewa 李哲羽 2011010x8)

Computer Science

Monday

It is the first time to meet Una-May and Erik that they have said that they were excited to be there, and I also want to use excited to describe my mood today. To tell the truth, I thought today I would meet a strict and old professor, so I kept nervous all the time, because I was afraid that professor's professional lessons would be too hard to understand. However, Una-may and Erik really gave us an excellent lesson; although Erik always couldn't control himself to speak fast which caused me always extend my neck to listen carefully. But it was really an interesting talking and I enjoy it. After introduction, we talked about evolution in action and found some examples to share with each other. Lastly, we had an assignment on programming. It was based on python, a new language for me. The program was about Prisoner's Dilemma. It is a small program, and I will do it well.

Tuesday

I was so happy that I had little other classes today, then I could spend more time to write the program about Prisoner's Dilemma. Erik changed the initial program into difference, added a little difficulties. He wanted us to strengthen our program. If we can use our programs to help prisoners to choose whether cooperate or not, we would succeed. So I kept on improving it, and I thought it was one part of arithmetic's evolution. It was so great that Una-May and Erik always helped us to solve the problems. And in the evening, we were offered many strategies on solving prisoners Alice and Bob's dilemma to play the game with different opponents. And we found that the strategy 'H' was the fittest. It was a flexible strategy that you should concentrate on opponents' choices and choose one which will be the most possible for you to win.

Wednesday

Today, we had a class in the morning again. The goal was to expand our understanding of evolutionary process. We had more scientific detail in biology. Then, we were asked to play another game. We got an envelope with many pieces of paper about genes and conditions, and everybody should choose these pieces to see whether the given color animal was alive in the given environment. This game was helpful to lead us to understand natural selection. Finally, we got another assignment that we should choose one topic which was based on doctors' materials and show what you learn in this material with one slide of PPT in Friday.

Thursday

Time goes so fast, it is the fourth day. I became accustomed to taking Una-May and Erik's lesson. All of us were excited because of our without-pay candies. It is so grateful. Tonight, Una-May and Erik explained their purpose to give us lessons and hoped that we could learn something. Even if we couldn't understand the evolution in arithmetic more, we really shared our ideas with partners, wrote what we have learned and would speak what we know tomorrow. So I really look forward to having next class. Of course, we had another game in the class. It showed how the different genes pass on. It gave me lots of fun, because two friends of mine picked up the opposite gender of themselves, and they became shy.

I like games since games are easy for us to remember including the knowledge in games. So I appreciate Una-May and Erik's way of teaching. This week leaves me a deep impression.

Journals

Guan Jingyi

Monday 2013/05/06

"Evolution is within us around us between us and its workings are embedded in the web of even fruit...we should celebrate its astonishing power"   ---*Bob Knight Obi Darwh Kemoh:*

Today we learned the definition of evolution and each of us have discussed with our partners examples about evolution. I believed it was my first time to have a class in such an entire western way.

During the class, I have listened so carefully because I wanted to improve myself into a higher stage. However, the carefully I was, the nervous I got. The bad feeling didn't continue until Una-May started to speak and tell jokes. She is an elegant lady full of passion and gradually I could relax myself, even concentrate on the lesson. I suppose it's absolutely different form our college's class, and I did get accustomed to the teaching style with my own effort.

The instructors are great people but I expect Hemberg could speak a little slowly so that we could catch you. Although Una-May looks kind but I still feel pressure when speak to her. I really hope us still be friends even though the course end.

Tuesday 2013/05/07

Tonight we continued to study evolution in a more active way, and actually wehad simulated itwith NIPD.

As far as I am concerned, one of the important properties of evolution is that weather the new creatures could adapt to the environment and even make the environment better or not. If the new thing could meet society's demands, it survived and if not, it would be sifted out.

It impressed me very much because I could see evolution is more complex than Monday when instructors showed Linux example. We could not see any process of Linux's evolution about time in the picture but we went through it tonight. It's surprised for me seeing strategy H to survive at last and as time passed by, other strategies became fewer and even extinct.

It's an interesting lesson. I think I will enjoy it in the remaining parts.

Wednesday 2013/05/08

Today we've learned more knowledge about evolution in biology view. Also we did an experiment under the instructors' guidance.

Learning evolution in a biological way expanded my understanding of evolutionary process. Although they are not in the same fields, I still felt magical when contact their processes in my mind. Then my knowledge about evolution had step on a higher stage finally. I could find evolution around me, the light---first created by Tomas Edison, and then light bulb, fluorescent tube, desk lamp, valves with beautiful shapes came up constantly. The doors, the windows, even human ourselves are evolving all the time! Evolution exist everywhere, every moment.

Thursday 2013/05/09

Tonight we continued to learn evolution by playing an interesting mating game. But at the end I felt strange that why I chose two male with high gene quality but got low offspring quantity. It still puzzling me when I am writing this journal. A-ha!

What's more, having the course during this week made my range of vision in evolution expanded. Now I can find out more and more examples in my daily life and the course also encourage me to observe carefully not only in class but also in my life.

Finally, thanks for Una-May and Hemberg's instruction. I've learned very much new things this week. I hope we will meet in the future.

俞家 Mona 2011 Civil Eng

6th May   Day 1

1. First lecture. Dr. Una-May and Dr. Erik were excited with enthusiasm, talking is also very interesting.

2. I learned a new way of study. Think → Pairs → Show. independent thinking is very important for pople to solve problems.

3. Evolution is a theory about the origin of life. Evolution is everywhere in our life. I think there are two reasons for things evolving. one is innovation and curiosity. like to try new things. Another is better survival. must adapt to external environment. otherwise will die.

4. Learning a new software in two days for me is really a big challenge. but I realize that we can try our limits to do some hard jobs.

7th May   Day 2

1. With Dr. Una-May and Dr. Erik's patient, detailed, step by step guidance, I learned how to use the software - Phython. Difference is. Chinese teachers way tell you the answer to the question. but they are more encourage us to think by ourselves. then gently lead you found the problem where is wrong.

2. By playing the game. "Prisoner's dilemma". we understand the theory more easily.

3. I learned that it will have different results when the same policy face different problems.

4. In the game. much more people choose to defeat in stead of cooperating with others.

第   页

I think this may be related to human's nature.

8th May Day 3

1. I have learned more about evolutionary process by biological evolution. and the evolutionary theory's ability to explain phenomena across the many subdisciplines of biology.

2. There are some questions which I have never thought about before. By lecture and sharing ideas with classmates. I do know more ignoral examples of evolutionary process.

3. The natural selection is cruel. knowing that by playing the game which imitate biological evolution. Something should be good that can survive.

9th May Day 4

1. learned a new idea is that learn something now you should go back to think what you really have learned.

2. Evolution is a scientific theory which can help people think and provide ways to solve problems. And small changes may lead to big evolution. Evolution may can not help people to be perfect but it do help us to be much better.

3. The question is even though people know what is the best but usually people use the second good things but not the perfect things.

4. There does exist connection between evolution and computer science.

Reflection about evolution

(Zoe   2011101046   Computer Science)

First class:

1, in first class, I have learned what the evolution is. I think the differentiation of stem cells is a good example of evolution. At the beginning, there are many stem cells. Later they differentiate into different cells, and they have different function that has no relation with each other. Some of them will die off. This is evolution—changes and makes progress.

2. I think evolution is always getting better and better and it becomes different every time. Trial and error is just to try, to test and to correct and biological experiment is a good example about this.

3. Things evolves because of they need to fit the environment. When the environment changes, they need to evolve and they will be better.

Second day:

We had played NIPD to pick which is the best NIPD Strategy. It is a funny game and I think there is something about algorithm. My major is the same with the two doctors—computer science. We also learn some algorithm in our major chasses. The train of thought is similar and I think this game gave me more ways to think about programming.

Third day:

1. At the first day, I learned evolution by the example of Linux, but today I learned more by biological evolution. I choose the topic of natural section in speciation, so I'd like to talk about this briefly. Speciation is the process that one species becomes two or more kinds species. Some of them would extinct if they couldn't adapt the environment. Natural selection makes the strong survive and selects the better one in speciation. The number of species is becoming more and more and they are different with each other. They cannot mate with each other.

Forth day:

1. Tonight, we play a game about how to pass the genes by mating with female or male. Female would choose male by the percentage of good genes, his trait and how many teeth he has to show his strength. This is a sexual selection, and I think there are not so many things about evolution at the beginning. After the game, I realize this is an evolution. Female always chooses the male who owns high percentage of good genes so that good genes will pass. According to the trait that female chooses, we can see what trait will pass. After many years later, more and more their generation will own good genes and more teeth on average. Sexual selection actually leads the development of this species. This is an evolution.

2. Two students share their ideas about evolution. It makes me

understand what evolution is clearly. I can not think other examples like

this. It really expanded my worldviews.

Reflective journal

Name: Ma Yuhui

During this short 5-day learning I not only learn python software and evolutionary processes but also feel the MIT teaching style. What most important is that this module's learning expands my worldviews. Now I will introduce what I have learned from Monday to Thursday.

Date: 6, May 2013 Monday

Today I meet professors Una-May and Erik. They are very knowledgeable, energetic and humourous. Today's teaching is relaxing and interesting and I have learned following things: During Linux example I have learned why, when and how things evolve. I know evolution is a process of something's development, as the time goes it will change and become better to satisfy its users. One thing can instead of the state of another one because user groups favor it over others. I also come up with an example of evolution is Chinese characters.

Date: 7, May 2013 Tuesday

Today I finished my python coding exercise. In the task we just need to add four possible situations to the file. First I make a fool mistake when I define "sentence="but the print is "sentences" so I have an error and can't ran my module. With the help of Erik I find my mistake and correct it and then I run my module successfully. During do this exercise I know earnest is very important for a programmer. At night, I take part in my first lab, it's very interesting. With the example of plant-rhizobium mutualism I know cooperation in nature is very common. Why they choose to cooperate? Because they need each other, only during cooperate can they survive. We also do a very interesting evolution simulation. During this simulation I see evolution is more complex than Monday when professors showed Linux example. I think competition and great strategy are important parts of evolutions. Things will be selected during competitions, who can adapt the environment who will survive and the weaker one will be dead. I like this funny way to learn something because we can take part in it and we can understand it easily.

Date: 8, May 2013 Wednesday

Today I attend the lecture 2 of Una-May. Through the typical example of giraffe, I understand biological evolution. As the tree is tall, just the giraffe whose neck is long can get food to eat, so the long neck giraffes will be selected and then they will inherit the great character to their descendant. The giraffes whose neck is short can't fit the environment and will be dead. We also do an exercise, everyone choose a dominant or recessive gene then a white or brown mouse will be born. In different environment, a forest or desert the mouse whose color is right can survive. Through this interesting simulation I understand biological evolution easily. In nature, every population has variety and has to compete with others. Natural law of survival is survival of the fittest so the stronger who can fit the environment better can be selected and survive. Else the weaker one has to eliminate through selection or contest. Then the suitable population can continue exist and start the process of variation and inheritance to fit the changeful environment. I also know an interesting thing is that Una-May's twin daughters have different color eyes. How magic gene is!

Date: 9, May 2013 Thursday

Today I take part in the lab 2, it's even more interesting than the first lab. During the process of choosing candies I know everyone has different favors on the kind of candy. During the simulation of male and female's mating, I know evolution also be influenced by other factors expect natural selection. I like this kind of teaching style because we can understand easily and think about more. As of today, I learn more about evolution than the first day and I know the differences between evolution and trial and error. Trial and error has no effect on following things, it is just a try to solve a problem. However, evolution's results can be inherited and has effects on offspring.

At last, I want to thank professor Una-May and Erik for their five days' teaching. 5-day learning is short but I think I have learned a lot about evolutionary processes and my worldviews really have been expanded. This learning experience will become a gem in my college life.

Journal 1, 2013/5/6

倪亚晨 Bobi

I was very excited to attend the excellent course today. I was interested in active learning style, so it made me enjoy my time in class.

Evolution is a process of gradual development in a particular situation or thing over a period of time. But trial is an experiment which we make to find a testify something to reach our aims. For example, it is a kind of evolution that the rat can run faster than before,however, when we find what makes the rat run faster in the lab, we call it trial. Error means wrong, but evolution has no error. There are just something that cannot fit in the special environment perfectly in the evolution.

Things evolve because they want to be better. Animals evolve to make them stronger in the face of enemies and plants evolve to have more advantages compared with their competitors. Goods evolve because manufacturers want to make more profits.

Environment make things evolve. For example, when it becomes colder and colder, the fur of rabbits become thicker. So rabbits evolve with the environment changing. When the good characteristics arise, things begin to evolve. Computers evolve from 1946 as new things have been happen almost every day. Actually things evolve from they come in being.

Journal 2,3013/5/7

倪亚晨 Bobi

I experienced an exciting day today. I played NIPD with my classmates and teachers. It was a very fun game and I enjoyed it very much.

Through the interesting game, I learned that one of the important properties of evolution was that evolution was accompanied by cooperation. Many things cooperated with each other because they need each other to live better. And ones who fitted better had higher rates of replication than weaker ones.

I thought that the evolution was more complex than Monday when I sew Linux example. It's easier to understand by playing games.

Journal 3, 2013/5/8

倪亚晨 Bobi

Darwin' s Theory Of Evolution impressed me greatly. I learned how a new species came into being through Darwin' s Theory. I felt it is a very complex process. Species intended to be bigger in size, more in number and more different. And nature control them. Nature give them chances and challenges.

I can give a example examples of evolutionary process. Sharks have live on the earth for a very long time. Even some scientists said that human beings came from sharks. Stethacanthus are accepted to be the earliest shark that lived in 3.6 million years ago. They are about 70 centimeters. But sharks ,nowadays, can reach as long as 5.5 meters. This is a good example about that Species tend to exponentially increase in size over generations.

Journal 4, 2013/5/9

倪亚晨 Bobi

The probability of deliver your genes to your offspring is decided by how attractive you are. Males must be excellent enough to acquire females' trust and females must be fascinating enough to attract males' attention. this theory indicates that species tend to become better and better. If you are excellent, you have more offspring. So humans are becoming cleverer, animals are becoming stronger and plants are becoming taller.

I had learned a lot in the past four days. I have a clear picture of evolution in my mind now. Thank Dr. Una-May and Dr. Erik for teaching us. I wouldn't like to say goodbye. And I want to ask the last question in the end. Whether nature can control evolution or evolution can control nature? Thank you!

Student information:
Name: 倪亚晨   English Name: Bobi   E-mail Address: 12ycni@stu.edu.cn

Journal of Evolutionary Processes and Systems

Day 1

- Difference between evolution, trial and error
  - Evolution is a process to select something like survivals of better species.
  - Trial is picking out something bad like quality testing in factories.
  - Error is something wrong and will result in bad consequences.
- What evolve?
  - In biology, creatures will evolve.
  - My opinion: Things contain human efforts evolve too like products
    - ◆ Music player: Tape recorder→CD player(Walkman)→Digital player(Mp3)
      - ● Actually it is the medium evolving: Tape→CD→Digital memory
    - ◆ Why and when? We need more music, higher quality, clearer, etc. New-born mediums fit the needs.
- PD & Python: funny and a bit challenging.
- If I have been relaxed, it might be better for me. In fact, the class is relaxing. I'd like to share my opinion of evolution.
- Demonstrate evolution in a simple way but it is a meaningful concept surrounding us.
- Una- May and Erik are amused, but Erik could be slower.

Day 2

- PD = a common model of evolution
- Plant-Rhizobium Mutualism: Plant-Bacteria Cooperate
- NIPD: strategy ≈ trait; num ≈ population
  - The fit Strategy grew into a big number
  - "H" became dominant
  - Interesting
- Important properties of evolution: traits fit the selection; bigger population
- Confusing: Una-May was promoting COOPERATE, but in NIPD the DEFECTING strategy became more dominant. So C is better or D is better?
- About evolution: there are some rules to select the individuals and the selection is partial to some traits (fitness).Others are extinct.
- I should have asked about what I felt confused.

Day 3

- NIPD programming exercise is much challenging. Not understand the demo very much.
- Evolution: Species with traits & restraints → new generations. Traits inherit from parents to offspring. Traits may change a little bit by a little bit. Overtime, new species is born.
- With more info on biological evolution, I think the definition of evolution become less abstract with more scientific details and many examples.
- EVOLUTIONARY GEMS are very interesting and it is difficult to choose one, but finally I choose #10 Selective survival in wild guppies
- Today, I think everything has its own evolutionary system but not everyone is easy to find.
- If I have been asked Erik about the code (the meaning of the number), I might comprehend more. Now knowing little about it.

Day 4

- Sweets ≈ Preference
- The sexual selection is a preference more than fitness
- Mating game: Amusing! I've tried my best to mate as much as possible with my bad traits, Ha ha...
  - Genetic values(fitness) & X-ray vision help improve the offspring
- Evolution & Computer science: a evolutionary system, put something into the system, it will evolve, more than mathematics.
  - Surprising! It's great. It seems to be a long way to promote the system.
  - Get something better but never perfect
- Examples of evolution: Languages and characters.

MORE:

Thanks Una-May and Erik a lot for teaching us in these 5 days! It's really different from the classes I have been. It's very simple and amusing! I would like the class being simple rather than complicated. Although there are just five days, I have developed the vision of evolution. You teach me with relaxed games and impress me with the strong emotion of game and I learned better. All in all, thanks for coming and wish your system being established soon.

Daily Journal of Evolutionary Processes

And Systems Exchange Program

Electrical Engineering Winnie (Guitong Lin)

Monday

The first day of MIT to STU exchange program gave me great excitement and surprise. We learn something new about the concept of evolution.

✓ What is the difference between evolution and trial and error?

- Evolution: Develop into a higher level and become better

    Always be changing and have an unknown future

    Go with the trend of times

    Bad or poor parts of them distinct

    E.P: Mobile phone, some animals (like giraffe), language

- Trial and error: May achieve wrong outcome

    Cannot change always

    May not go with the trend of times

    E.P: Kodak, some medical discoveries

✓ Why do things evolve?

- To go with the trend of times
- To cater some needs coming from both inside or outside
- Some old things distinct and to make change

✓ How do things evolve?

- Depending on the original background
- Change some branches of parts of the things but not change the whole thing at one time
- The changed parts should agree with the old parts

✓ When do things evolve?

- When something goes not very well inside
- When the trend of times need the things to make change

Tuesday

Today is a Lab Day. But in fact it was not that I had imagined to be a night sitting in front of computer and to keep programming the whole night. It was quite fresh for me to play games and I knew something newtonight.

After having simulated evolution with NIPD,

✓ What are important properties of evolution?

- Population effects, it means the more, the much possibility to survive longer
- Species cooperate together.
- Some certain environment selections matter.

✓ I do see evolution as more complex than the Linux example. Because evolution

- Should be selected by the hard environment
- Have opponents
- Need cooperation to strive for better traits of themselves

Wednesday

We talked about evolutionary biology and learnt some evolutionary gems which are related to the Darwin's Theory of evolution.

✓ How does more information on biological evolution extend your understanding of evolution?

- Darwin's Theory need much more evidents to support itself like fossils.

- Environment made evolution.

- Variation should change to fit the changing situation.

✓ More examples of evolutionary process?

- Giraffe's long neck
- The changed color of kinds of fish
- The changed shape of animals like & elephant's teeth

Thursday

We played a game called "Mating Season" and I was the "female" and I got pregnant twice in that season.

In the game I learnt that:

- Every organism is desire to keep their his genetic value for a long time.

- Organisms fight for survival and win the opponents by their better and genetic values.

- Not all the best organism with best genetic value can survive if he met someone stronger and hard environment.

Brief Sum-up

I had experienced something totally fresh in STU in this exchanged program. We played games and then learnt something about biology and also a new programming language these days. Teachers motivated us all the time to "think, pair and share". And I indeed I enjoyed this process a lot. I can understand Darwin's Theory of evolution better though I heard it before.

The model of teaching method is new and the knowledge we learnt is was new, too. I appreciate that I have the chance to experience all of this, and met good teachers and made new friends who helped me with my programming skills a lot. I'd like to say "thank you" to the teachers and my friends.

I think Una-May is a so kind person when teaching because she would correct my mistake in a so gentle way that made me moved. And I think Erik is a big boy with excellent programming skill which I admired so much.

I'd like to say welcome you guys to come to STU again and we can meet each other in the future.

Thank you!

Journal about Evolution

201101032 John 11 Computer Science

2013. 5. 6:

Today, the class came. It was really exciting. It was very nice to meet two funny teachers.

[What is the difference between evolution and trial and error?]:

I think evolution is from a trial. And as a trial, it will become an error. So evolution is not a simple trial, and it also will cause error.

[Why do things evolve?]:

Everything in the world wants to live but not die. So the only way to live is to evolve. Only that, they can adapt to the environment.

[How do things evolve?]:

They can have different ways to evolve. Most of them will inherit their parents and change something according to the environment.

[When do things evolve?]:

Things will change themselves every second. When they get enough change, when they feel they are not fit with the environment, they start to evolve.

2013.5.7:

We played a funny game today. And we learn about the strategy.

I major in computer science and I am an ACMer. It means that

I always study algorithm and I also know about some game theory

such as Bash Game, Wythoff Game and Nimm Game. It was really

funny.

2013.5.8:

Today, I knew many examples about biological evolution like

whales' evolution. It makes me know deeply about the

biological evolution. Here is another example about the

evolutionary process. People's ancestor used their four feet

to walk. But as you can see now, people only walk by two feet.

It is a big evolution of human.

2013.5.9:

What a funny game about "marriage". It told us about the

sexual section. Only the strongest one can get lots of children.

It reminded me that the programming language was also getting

an evaluation. According to a survey, we knew that C and C++

language were popular. But the language of Pascal was on the

other side. The language which was natural and easy to

understanding will replace other language.

By ALEX （英佐）

Journal1   Monday

It was not the first time that we touched evolution,during the high school,we learned a lot about evolution,i think the the difference between evolution and trial and error is evolution is the change of some traits of some species and other things,for example,the evolution of human beings,trial and error is just like the method which no good or not systematic ,and you use this method to do something by repeated and many different kinds of try until you success,for example,you do a python program and you make many mistakes,you don't know what to do because you don't know the meaning of the code,so you correct the code random though you don't know it meaning and you try many times and you success.Things need to have evolution because it need to developed more well and only its evolution can make it survive.Things may have evolution by it environment ,the traits of itself. And its opponent.It will changed by these factors and try to develop more well.When thing can't suitable for it environment of will die out ,it will make evolution,if not,it will die out.

Journal2   Tuesday

I was excited because we can do the program,the new langue we used was called Python,we make 3 programs in the morning. I felt so full of achievement,In the night class,we make a NIPD game, I was amused about why strategy H always win,it so funny,though program,we can see the process.The important properties of evolution are survive and die out. It was obvious in the nature.Compared to Linux system,maybe the evolution of character of chinese play the same role int the complex of evolution because the development of character have experienced about 5000 years,during the development of character,it has been changed to many kinds of other character and become more simple,with time goes by,some character which can be wrote more easily and can be understood well would be retained.

Journal 3 Wednesday

Today,I learned more about the information on biological evolution .The things I was familiar with is the Darwin's biological evolution.Teachers give us a lot of examples in the world,for example the insect's evolution.Also,the Inheritance of Traits,We have learned in the high school,However,there are also some Gems that we do not know.From the learning of those gems,I expand my knowledge of biological evolution.Other example which i find is mutualism in the biology,for example,the effect soybean and rhizobium.Also,there are many examples for us to find and explore.

Journal 4 Thursday

Have being learned evolution for 4 days,Although I can't digest all the knowledge of this class and don't have much understand of the program, I know the idea of basic meaning of evolution ,It is a process,It make something better and better ,But it can't make the things best.what we learned is it idea,we can use the ideas of evolution to solve some complex problems.Also,Tonight ,I know the sexual slection was a complement of natural slection, it can make the evolution more perfect.So,my question is ,which take a more important part in evolution?the natural slection or the sexual slection? May be the two take the same part in the evolution.To sum up the four days learning,I got a lot. I can use it in my latter learning and I will also get more.