



Lecture 2

Word Problems & Algorithms

سورة طه پارہ: 16

قَالَ رَبِّ اشْرَحْ لِي صَدْرِي^{لا} ﴿٢٥﴾

[قَالَ: اس نے کہا] [رَبِّ: اے رب!] [اشْرَحْ: کھول دے] [لِي: میرے لیے] [صَدْرِي: میرا سینہ]

وَيَسِّرْ لِي أَمْرِي^{لا} ﴿٢٦﴾

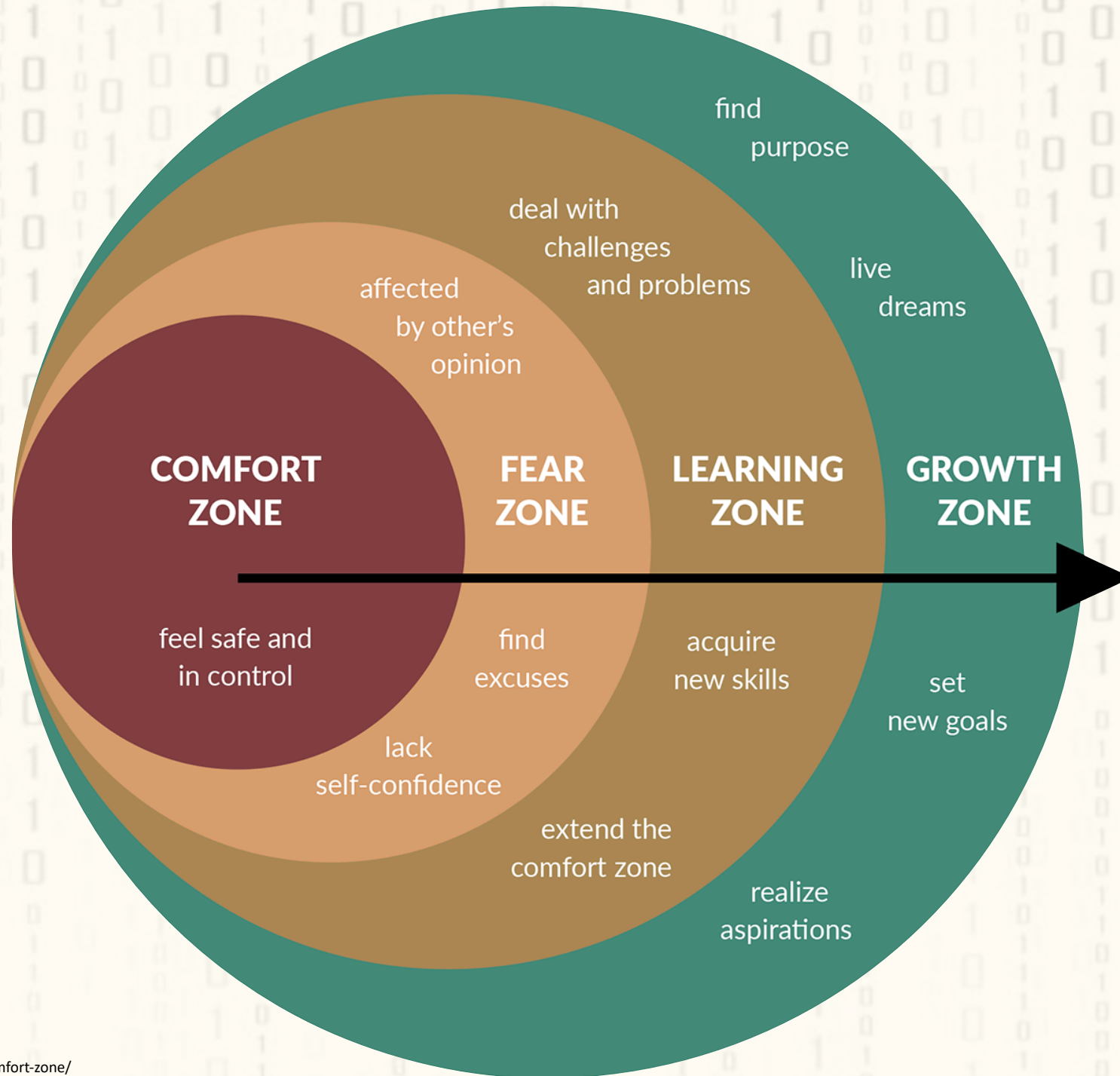
[وَيَسِّرْ: اور آسان کر دے] [لِي: میرے لیے] [أَمْرِي: میرا کام]

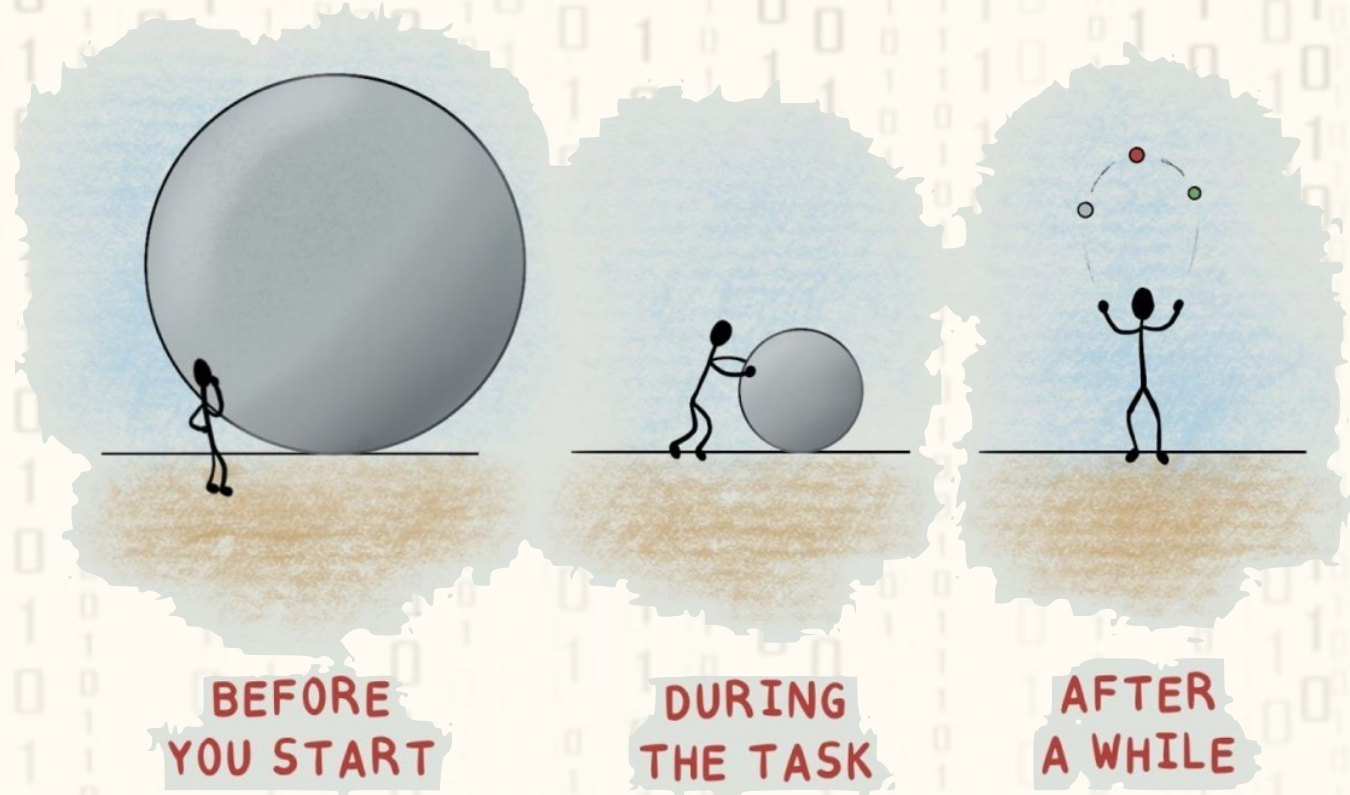
وَاحْلُلْ عُقْدَةً مِّنْ لِّسَانِي^{لا} ﴿٢٧﴾

[وَاحْلُلْ: اور کھول دے] [عُقْدَةً: گرہ] [مِّنْ: سے] [لِّسَانِي: میری زبان]

يَفْقَهُوا قَوْلِي^ص ﴿٢٨﴾

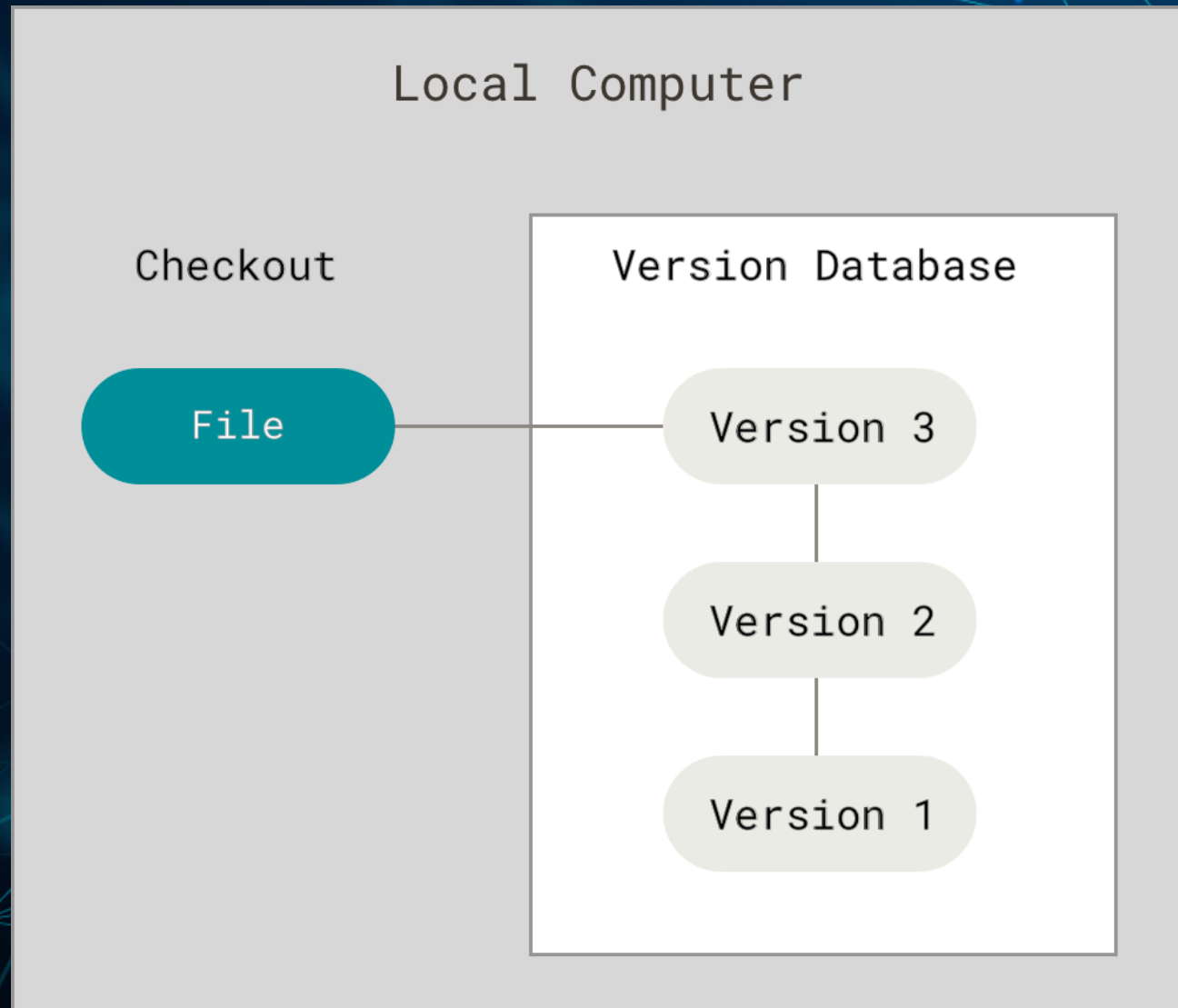
[يَفْقَهُوا: وہ سمجھ سکیں] [قَوْلِي: میری بات]



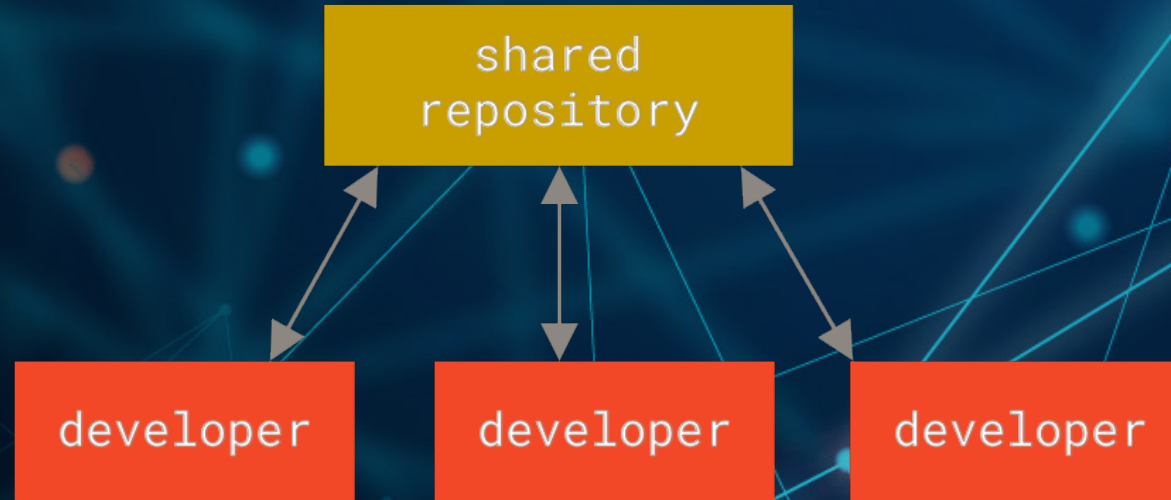




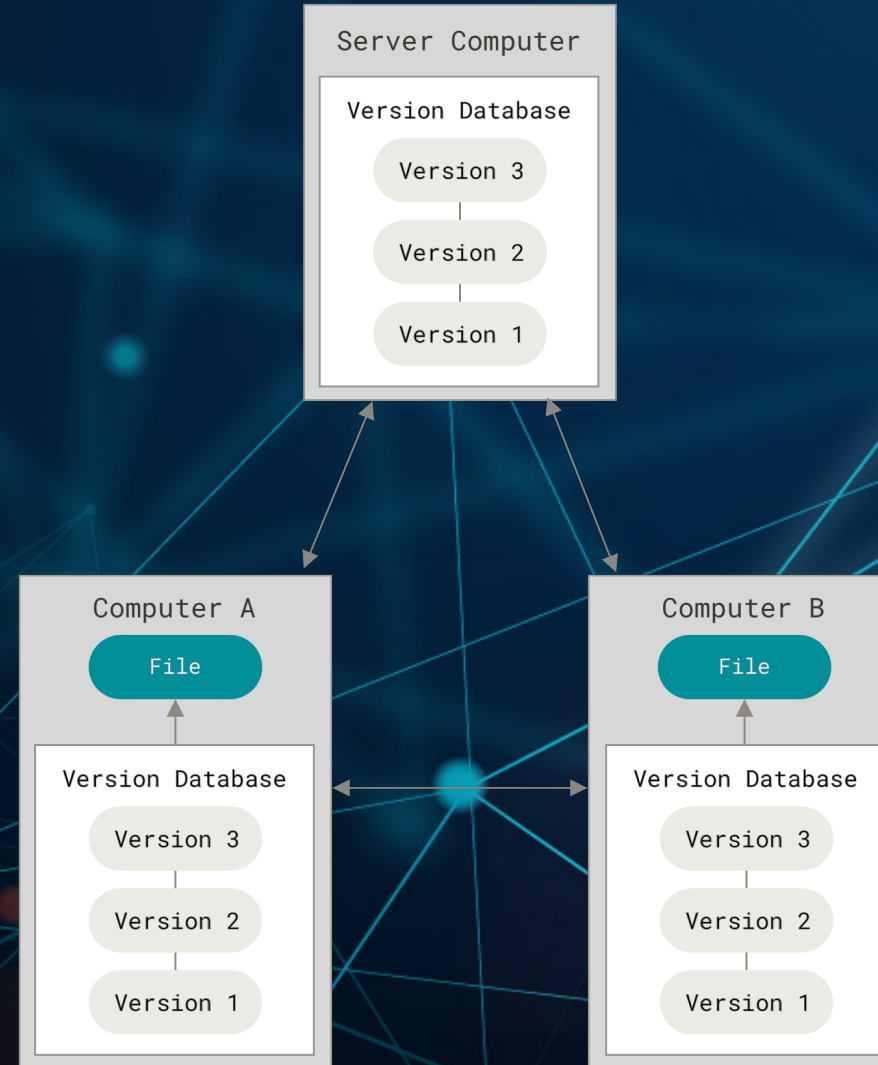
GITHUB



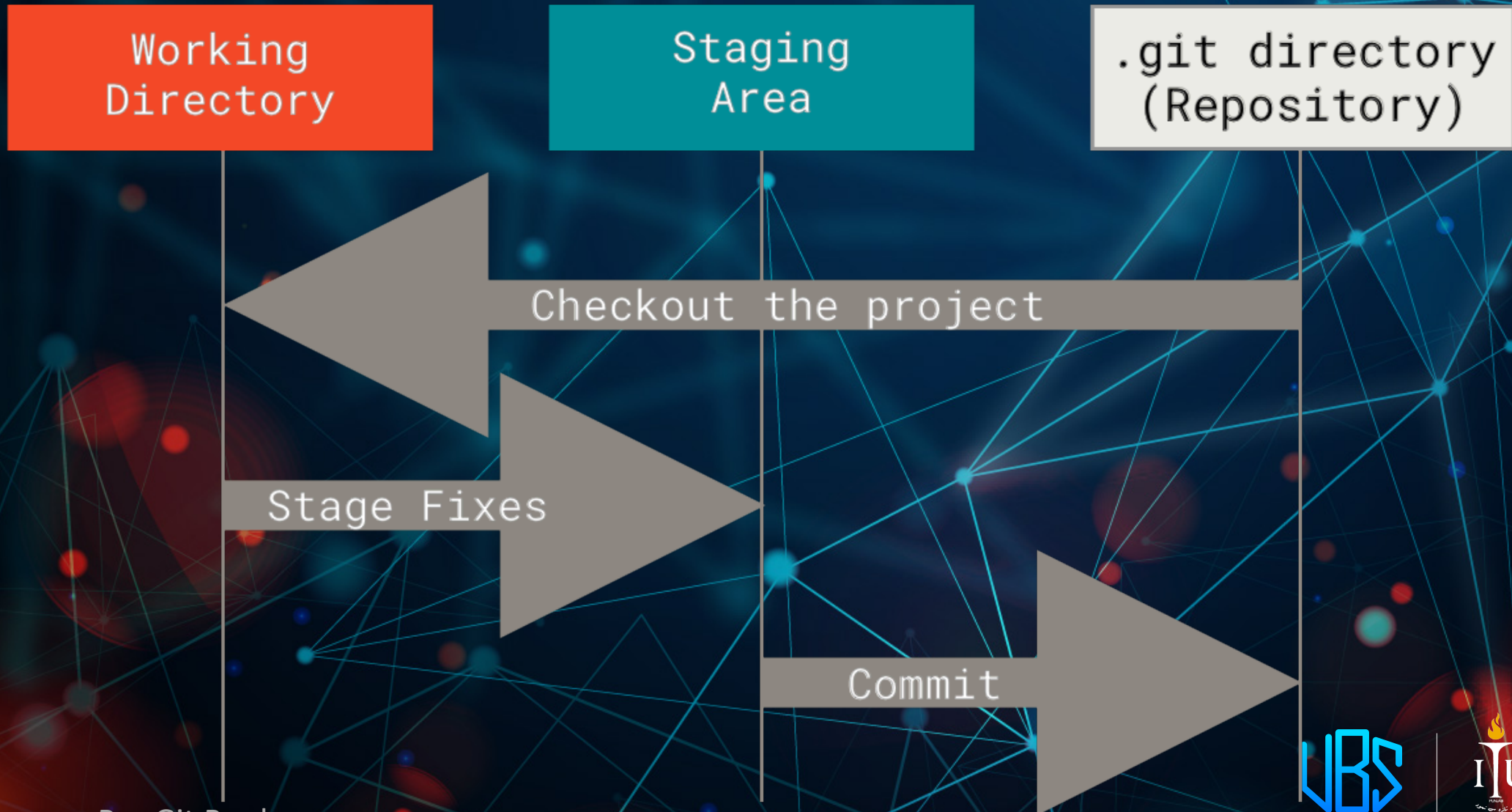
CENTRALISED VERSION CONTROL SYSTEMS



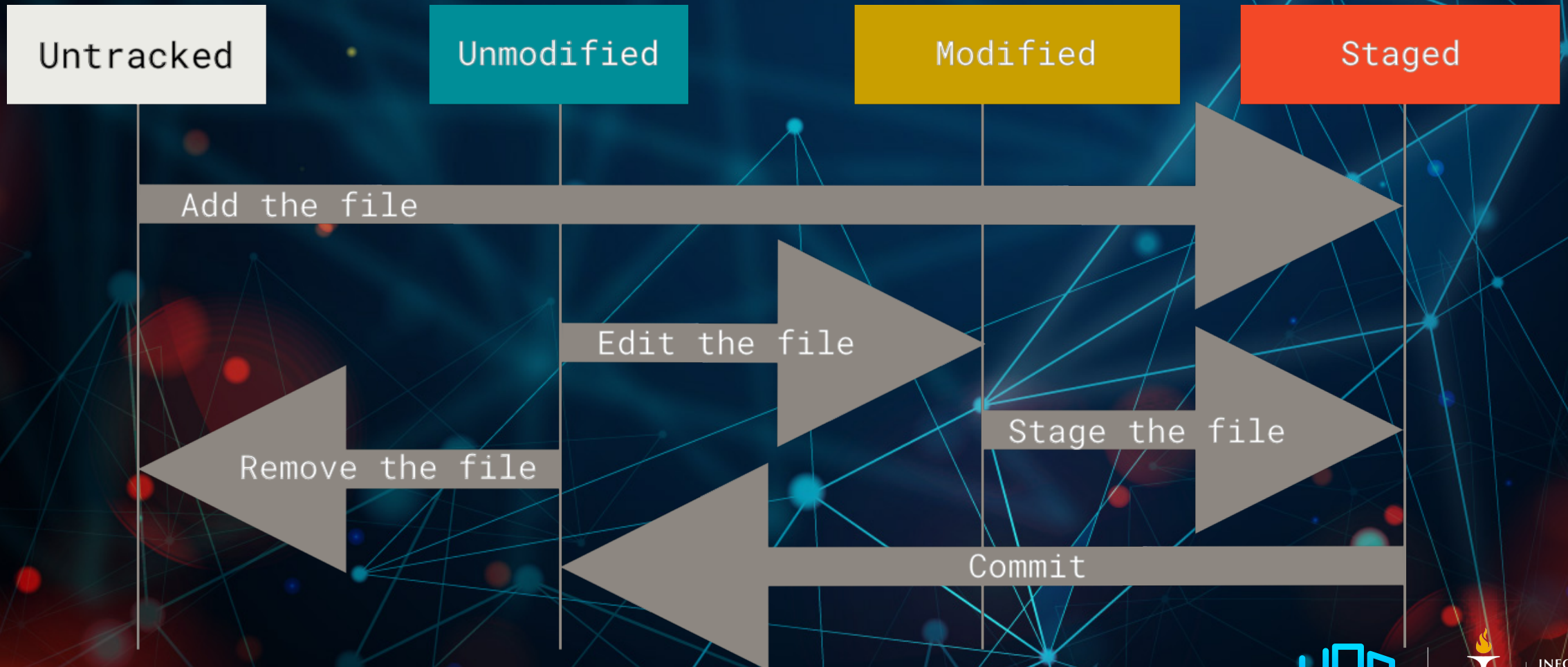
DISTRIBUTED VERSION CONTROL SYSTEMS



SECTIONS OF A GIT PROJECT



Recording of Changes

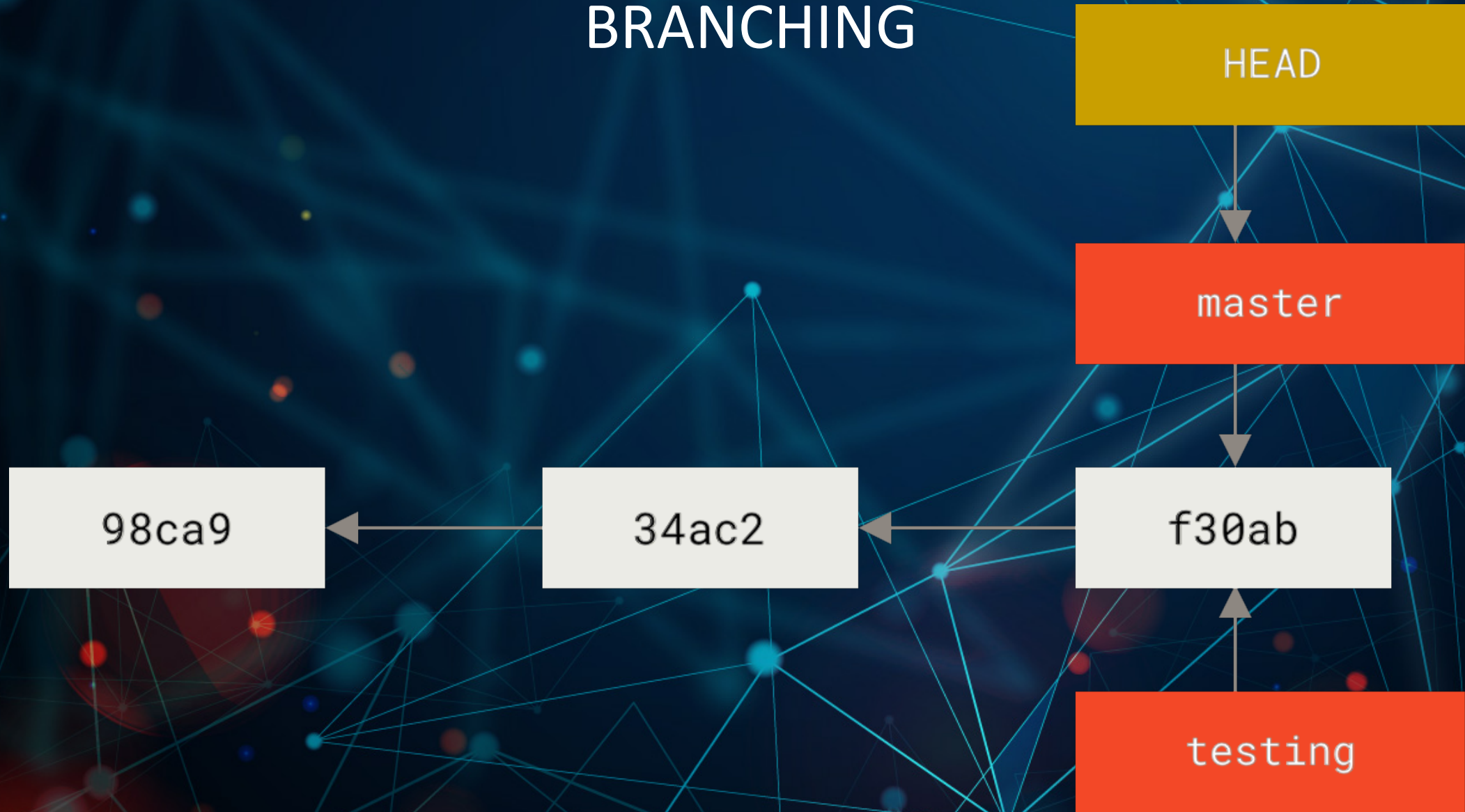


BRANCHING

git branch testing

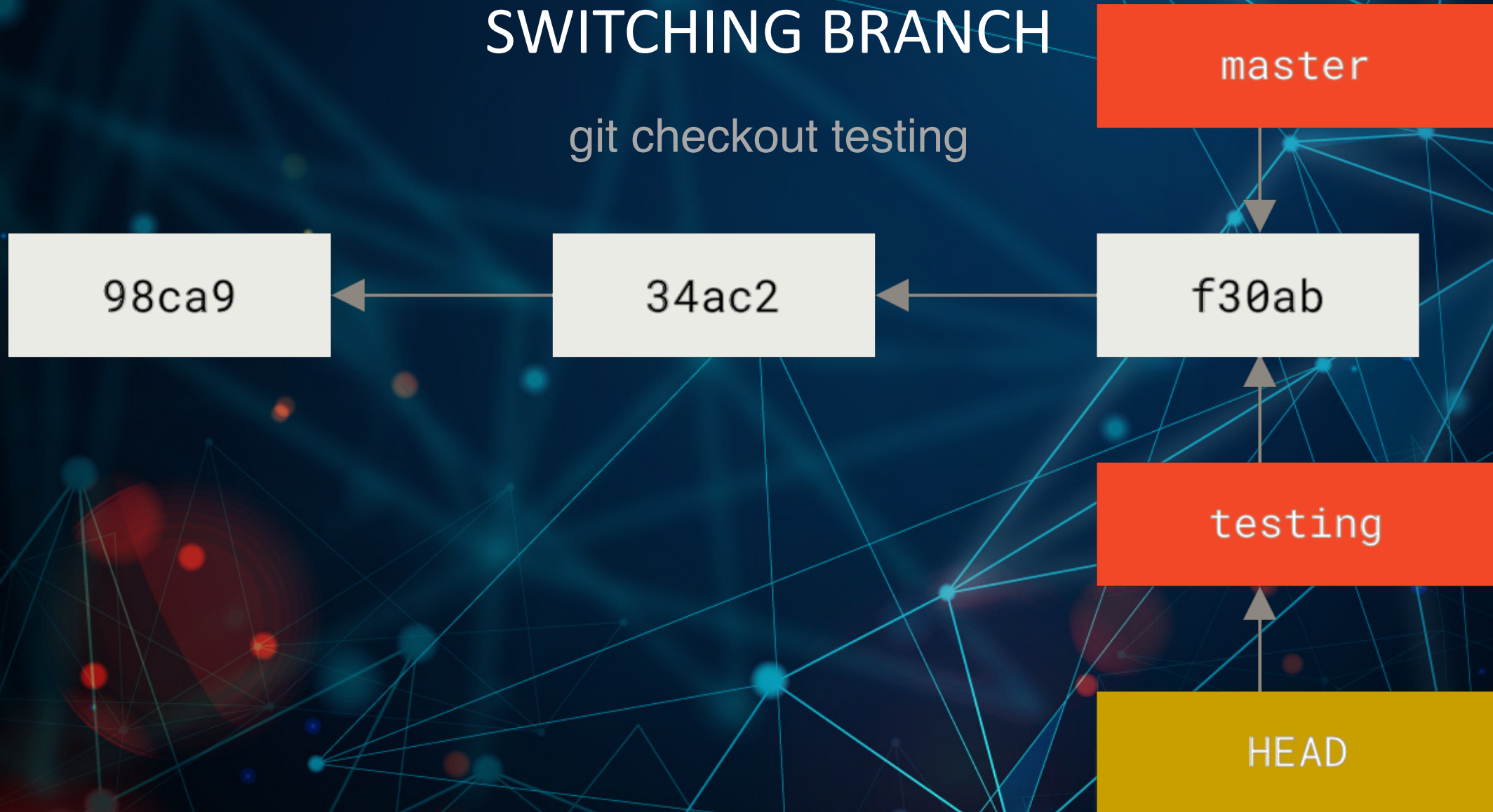


BRANCHING

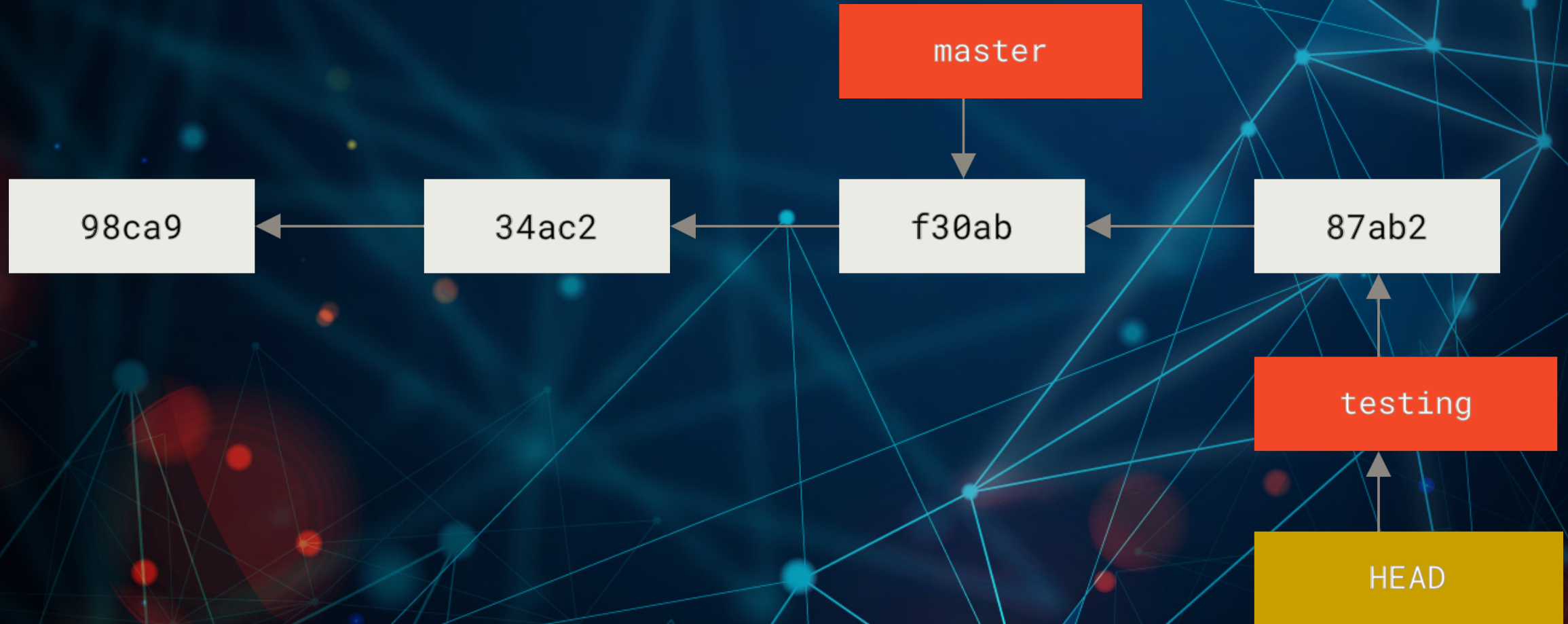


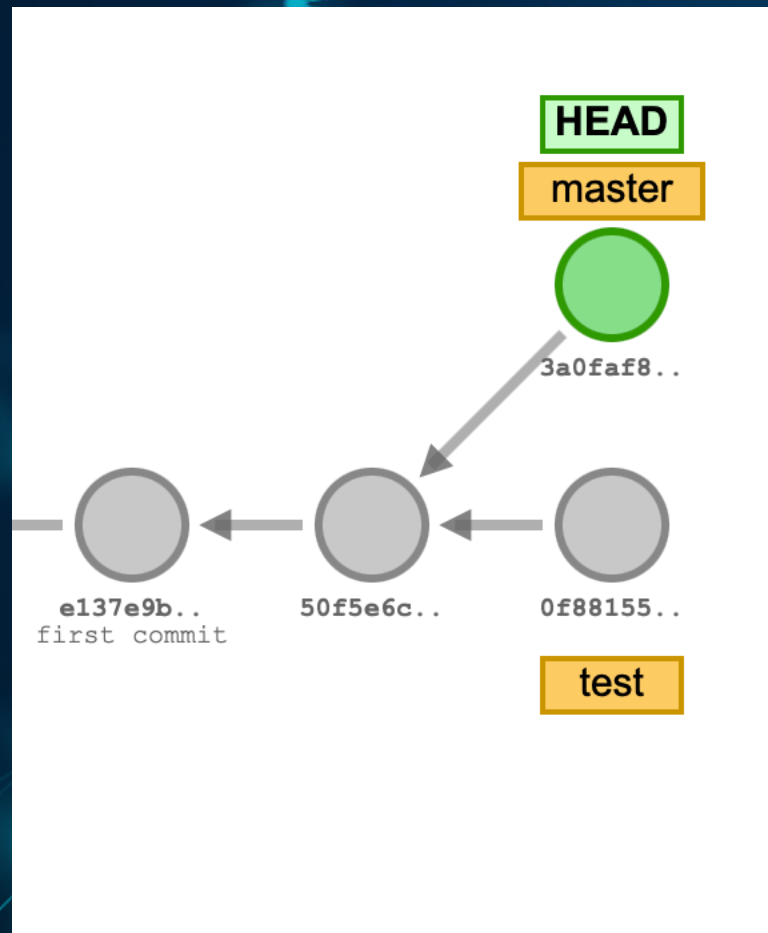
SWITCHING BRANCH

git checkout testing



MULTIPLE BRANCHES





<http://git-school.github.io/visualizing-git/>

Visualisation of the process

GIT IGNORE FILE

```
# ignore all .a files
```

```
*.a
```

```
# but do track lib.a, even though you're ignoring .a files above
```

```
!lib.a
```

```
# only ignore the TODO file in the current directory, not subdir/TODO  
/TODO
```

```
# ignore all files in any directory named build build/
```

```
# ignore doc/notes.txt, but not doc/server/arch.txt doc/*.txt
```

```
# ignore all .pdf files in the doc/ directory and any of its subdirectories  
doc/**/*.*pdf
```


Word Problems

- Read the problem.
- Identify and list the facts.
- Figure out exactly what the problem is asking for.
- Eliminate excessive information.
- Pay attention to units of measurement.
- Draw a diagram.
- Find or develop a formula.
- Consult a reference.
- Do the math and check your answer.

Sample Problem

A salesman sold twice as much pears in the afternoon than in the morning. If he sold 360 kilograms of pears that day, how many kilograms did he sell in the morning and how many in the afternoon?



Sample Problem

To deliver an order on time, a company has to make 25 parts a day. After making 25 parts per day for 3 days, the company started to produce 5 more parts per day, and by the last day of work 100 more parts than planned were produced. Find how many parts the company made and how many days this took.



Sample Problem

A train travels from station A to station B. If the train leaves station A and makes 75 km/hr, it arrives at station B 48 minutes ahead of scheduled. If it made 50 km/hr, then by the scheduled time of arrival it would still have 40 km more to go to station B. Find:

- A) The distance between the two stations;
- B) The time it takes the train to travel from A to B according to the schedule;
- C) The speed of the train when it's on schedule.



Sample Problem

Jenna and her friend, Khalil, are having a contest to see who can save the most money. Jenna has already saved \$110 and every week she saves an additional \$20. Khalil has already saved \$80 and every week he saves an additional \$25. Let x represent the number of weeks and y represent the total amount of money saved. Determine in how many weeks Jenna and Khalil will have the same amount of money.



Sample Problem

Two students leave school at the same time and travel in opposite directions along the same road. One walk at a rate of 3 mi/h. The other bikes at a rate of 8.5 mi/h. After how long will they be 23 miles part?



Sample Problem

Jacob's hourly wage is 4 times as much as Noah.
When Jacob got a raise of 2 dollars, Noah accepted a new position that pays him 2 dollars less per hour. Jacob now earns 5 times as much money as Noah. How much money do they make per hour after Jacob got the raise?



Sample Problem

A cash drawer contains 160 bills, all 10s and 50s. If the total value of the 10s and 50s is \$1,760. How many of each type of bill are in the drawer?



ALGORITHM

Step 1: Obtain a description of the problem.

Step 1: Obtain a description of the problem.
Step 2: Analyze the problem

Step 1: Obtain a description of the problem.

Step 2: Analyze the problem

Step 3: Develop a high-level algorithm.

Step 1: Obtain a description of the problem.

Step 2: Analyze the problem

Step 3: Develop a high-level algorithm.

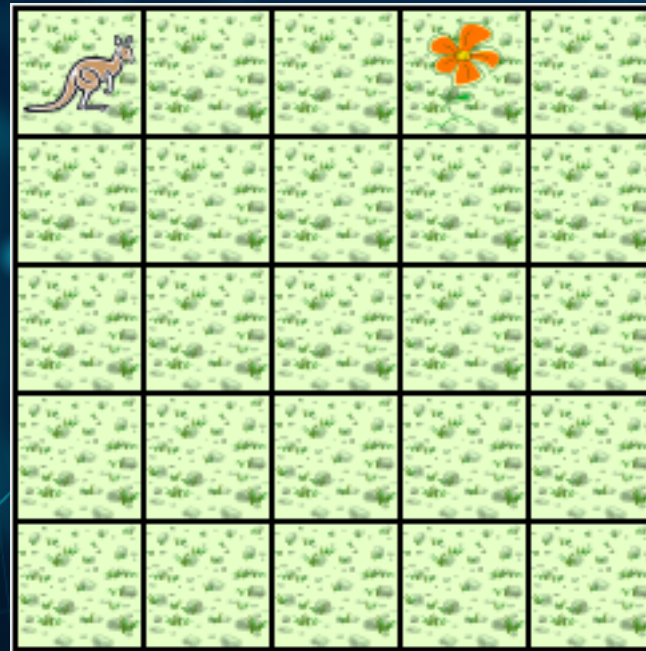
Step 4: Refine the algorithm by adding more detail.

- Step 1: Obtain a description of the problem.**
- Step 2: Analyze the problem**
- Step 3: Develop a high-level algorithm.**
- Step 4: Refine the algorithm by adding more detail.**
- Step 5: Review the algorithm.**

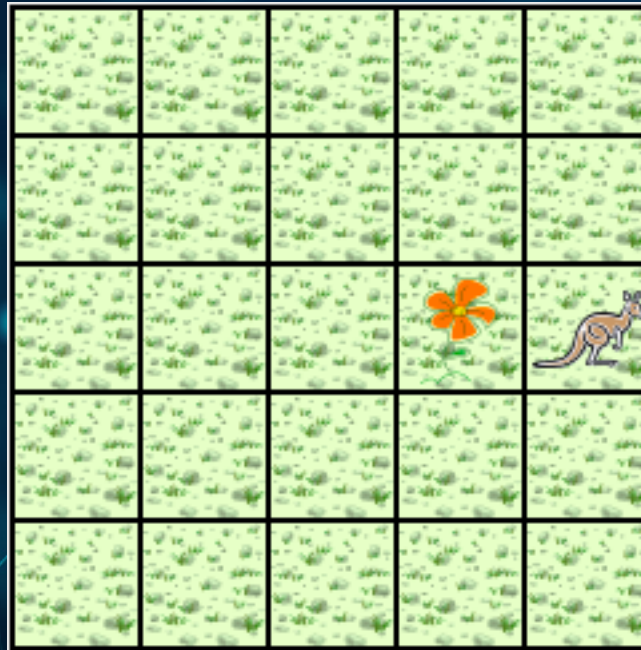
Example

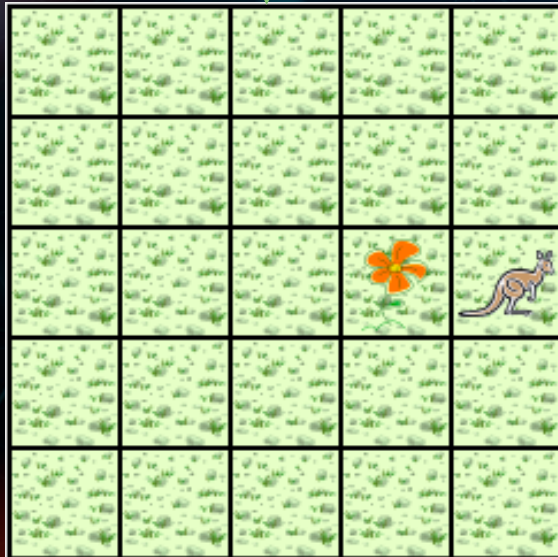
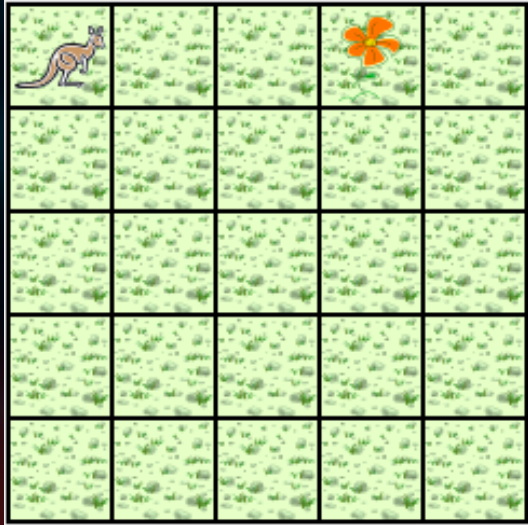
A Jeroo starts at $(0, 0)$ facing East with no flowers in its pouch. There is a flower at location $(3, 0)$. Write a program that directs the Jeroo to pick the flower and plant it at location $(3, 2)$. After planting the flower, the Jeroo should hop one space East and stop. There are no other nets, flowers, or Jeroos on the island.

Starting Point



Ending Point





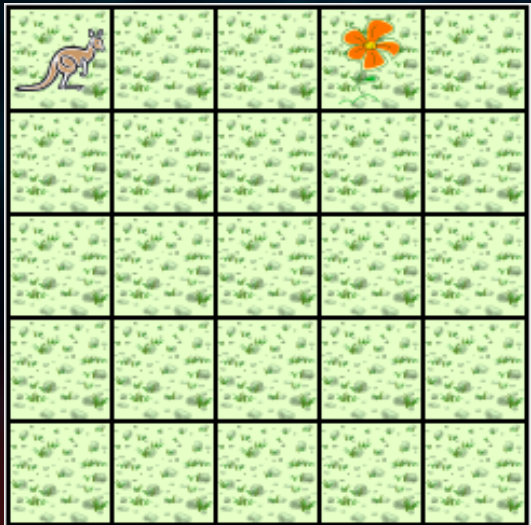
Analysis of the Problem (Step 2)

The flower is exactly three spaces ahead of the jeroo.

The flower is to be planted exactly two spaces South of its current location.

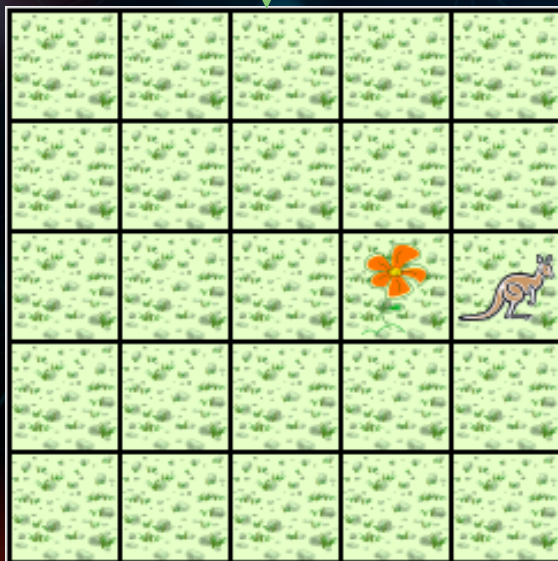
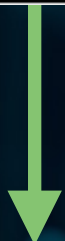
- The Jeroo is to finish facing East one space East of the planted flower.

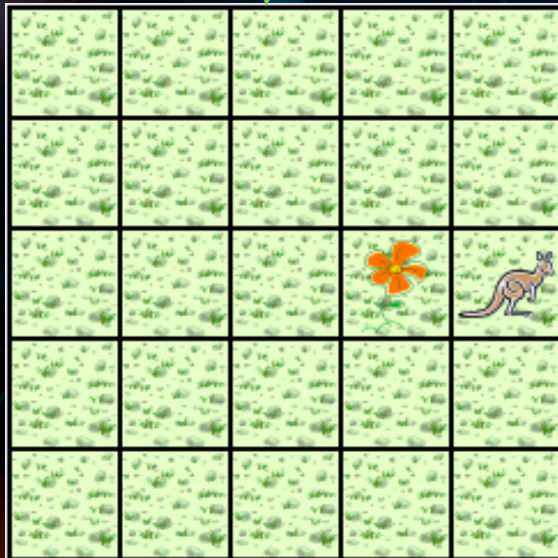
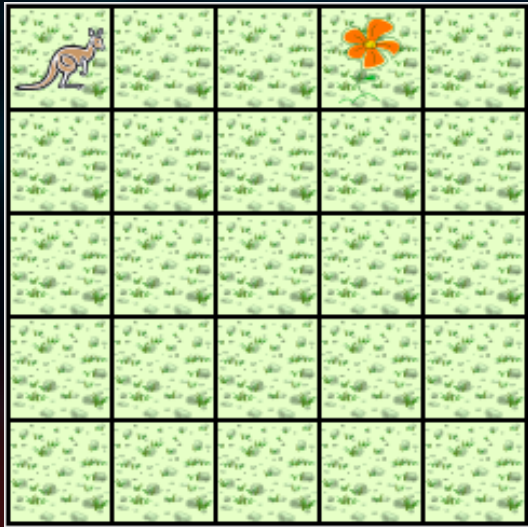
There are no nets to worry about.



High-level Algorithm (Step 3)

Get the flower
Put the flower
Hop East

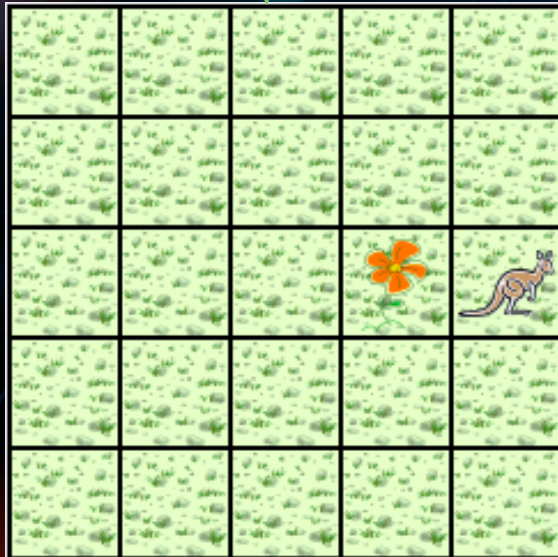
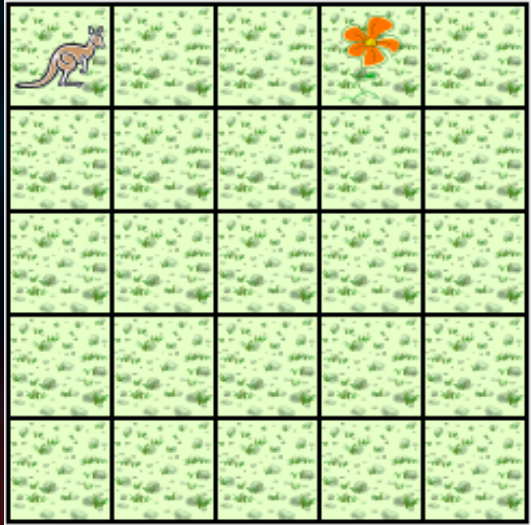




Detailed Algorithm (Step 4)

Get the flower
Hop 3 times
Pick the flower
Put the flower
Turn right
Hop 2 times
Plant a flower
Hop East
Turn left
Hop once

Review the Algorithm (Step 5)



References

- <http://sofia.cs.vt.edu/cs1114-ebooklet/chapter4.html>



QUIZ