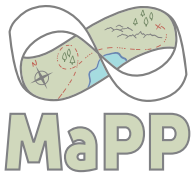
MaPP Challenge '18

Mathematical Puzzle Programs

Version 2017/09/16

Part I

Game Overview



MaPP Challenge '18

Rules

Welcome to the world of **Mobile Monsters**, or Mobímon for short! Not to be confused with a similarly named video game series loved by fans the world over, Mobímon is a *completely original* concept where Trainers befriend monsters and use them to battle opponents. (Cough.) Of course, as your team journeys to become today's Mobímon Champion, you should expect a wild **puzzle** or two to appear...

Leagues

Each team is registered in either the Competitive or Recreational League. If both Leagues are playing simultaneously today at your campus, then all scoring and awards are handled separately in both Leagues.

Schedule

The game officially begins at _____ and ends four hours later at _____. All solutions are due at Game Control by the end of the game; late submissions will not be considered.

Opening Puzzle

The game begins with an Opening Puzzle to warm things up. Solving this puzzle quickly will earn your team **5 Victory Points** and immediately move on to the rest of the puzzles! Don't worry about getting stuck, as all remaining teams will be allowed to move on at _____. However, you cannot earn Victory Points for this puzzle after that time.

Main Puzzles

After solving the Opening Puzzle, you will receive four Main Puzzles. While you'll be given explicit instructions on how to reveal the word or phrase that solves each Main Puzzle, you'll have to rely on your mathematical modeling and problem-solving abilities to actually make it happen. Report your solution to Game Control before the end of the game, and your team will earn **15 Victory Points each**, for a maximum total of **60 Victory Points**.

Bonus Puzzle

Along with the four Main Puzzles you will be given a Bonus Puzzle. This optimization puzzle doesn't have a unique solution, but you should still attempt to submit the best solution you can to Game Control before the game ends. That's because if your team is tied in Victory Points with another team, your scores on the Bonus Puzzle will be used to **break the tie**. You may submit up to three solutions throughout the game (including any invalid submissions), and your best solution of the three will be considered.

Cryptic Puzzles

You will be given the opportunity to solve an additional Cryptic Puzzle for every Main Puzzle you solve. These puzzles aren't as straight-forward as to their solution techniques, but your team might be able to use your critical thinking to extract a hidden word or phrase. Submitting this solution to Game Control will earn your team **5 Victory Points each**, for a maximum total of **20 Victory Points**. Teams stuck on a Main Puzzle will get their shot eventually: all Cryptic Puzzles will become available to all teams at _____, one hour before the game ends.

Metapuzzle

If your team is clever enough to solve all four Cryptic Puzzles, a final Metapuzzle will become available. A correct solution submitted to Game Control is worth **10 Victory Points**. This puzzle will become available to all teams at _____, one hour before the game ends.

Another Puzzle?

Shrewd players may discover how to earn an additional **5 Victory Points** for their team...

Hints

Recreational teams may ask for hints at Game Control at any time during the game, for any puzzle. Competitive teams may only ask for hints to help with the Main Puzzles during the final hour of the game, starting at _____.

Winning the Game

The team that earns the **most Victory Points out of 100** by the end of the game is the **winner**. If any teams are tied, their Bonus Puzzle scores will be used to break the tie. If that's not enough, then the tie will be broken based on how quickly those teams earned their Victory Points (the time each team submitted its last correct puzzle solution).

Additional Rules

- Players should not do anything which would interfere with other teams solving puzzles. Be a good sport!
- Submissions for each puzzle, besides the Bonus Puzzle, are unlimited. Every submission for the Bonus Puzzle will be carefully graded by Game Control, so only three submissions are allowed.
- Teachers and chaperones are not allowed to help Competitive teams solve puzzles, but they may serve as a means of communication between those teams and Game Control when appropriate (e.g. for rules clarifications).
- Teams may use any resources they have brought (phones, computers, etc.) to solve puzzles, but Competitive Teams may not receive any direct assistance from outside their team (e.g. you can't Phone a Friend).
- Players must remain within any physical boundaries set by both Game Control and their teacher/chaperone at all times.
- Teachers/chaperones are responsible for their students at all times.
- Since this game will be played at different campuses on different days, please do not spoil any of today's puzzles or solutions online until the game book is released publicly on MaPPmath.org!
- Contact Game Control immediately in the case of emergency or any issues with these rules.

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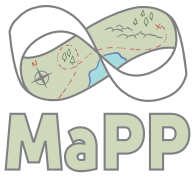
Code Sheet

Letter	Decimal	Binary	Morse Code	Braille	Pig Pen	ROT13
A	1	00001	·–			N
B	2	00010	–···			O
C	3	00011	–·–·			P
D	4	00100	–··			Q
E	5	00101	·			R
F	6	00110	··–·			S
G	7	00111	––·			T
H	8	01000	····			U
I	9	01001	··			V
J	10	01010	·–––			W
K	11	01011	–·–			X
L	12	01100	·–··			Y
M	13	01101	––			Z
N	14	01110	–·			A
O	15	01111	–––			B
P	16	10000	·––·			C
Q	17	10001	––·–			D
R	18	10010	·–·			E
S	19	10011	···			F
T	20	10100	–			G
U	21	10101	··–			H
V	22	10110	···–			I
W	23	10111	·––			J
X	24	11000	–··–			K
Y	25	11001	–·––			L
Z	26	11010	––··			M



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Scoresheet

Game Control and your team each have a copy of this scoresheet. When submitting solutions, bring your team's copy to Game Control to be updated.

School Name	Team Name/ID

Opening Puzzle

5VP if solved before deadline, Time Solved used to break ties in VP+Bonus

Untitled	Time Solved	VP Earned

Main Puzzles

15VP for each Main Puzzle solved; Time Solved used to break ties in VP+Bonus

1	Go Get 'Em	Time Solved	VP Earned
2	When Push Comes to Shove	Time Solved	VP Earned
3	The Nickname Rater	Time Solved	VP Earned
4	Endless Enigmas	Time Solved	VP Earned

Bonus Puzzle

Best submission used to break ties in VP

The Expedition Zone	First Submission	Second Submission	Third Submission

Cryptic Puzzles

5VP for each Cryptic Puzzle solved; Time Solved used to break ties in VP+Bonus

1	???	Time Solved	VP Earned
2	???	Time Solved	VP Earned
3	???	Time Solved	VP Earned
4	???	Time Solved	VP Earned

Metapuzzle

10VP if solved, Time Solved used to break ties in VP+Bonus

???	Time Solved	VP Earned

5VP if earned, Time Acquired used to break ties in VP+Bonus

Additional VP	Time Acquired	VP Earned

Total VP Earned

Part II

Opening Puzzle

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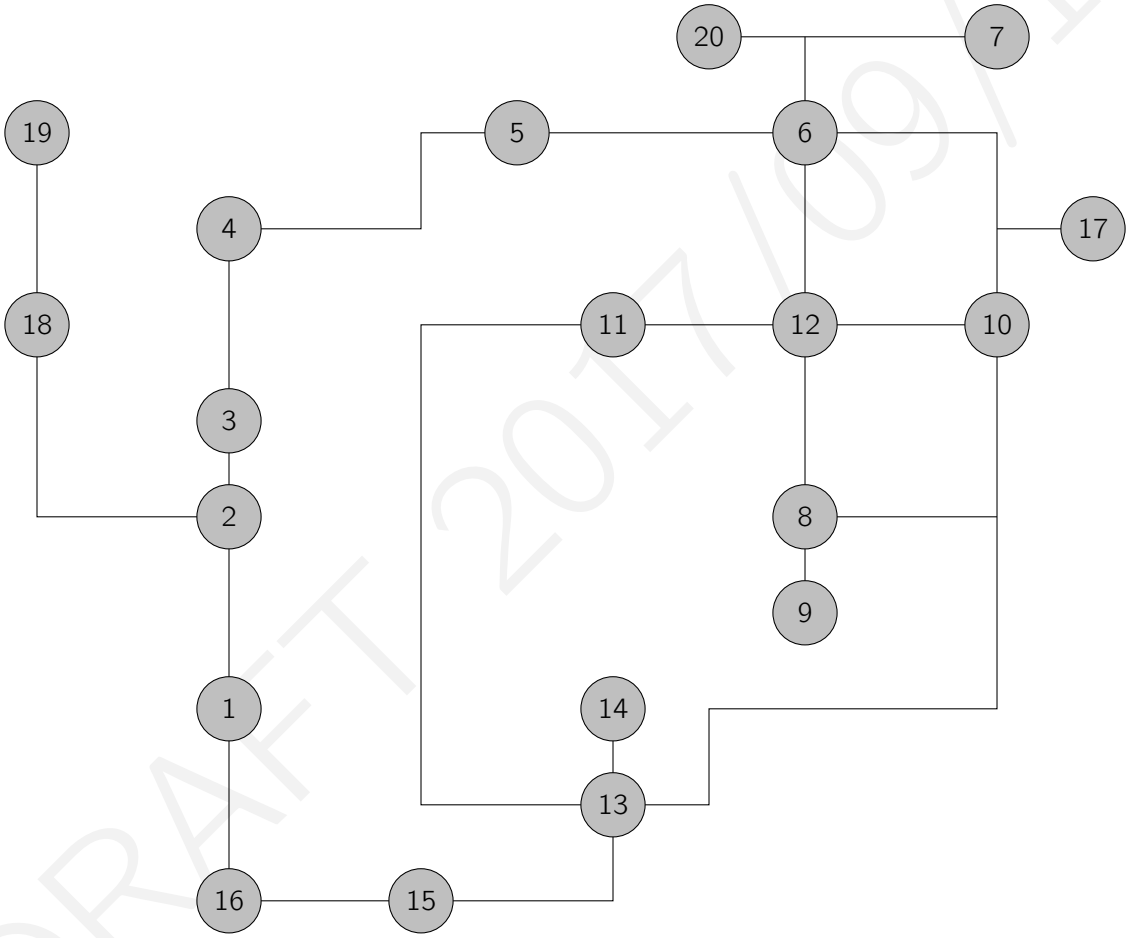
Untitled

Opening Puzzle

TODO



Part III

Main Puzzles

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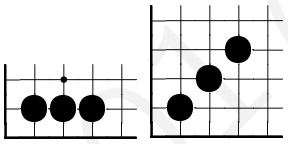
Go Get 'Em!

Main Puzzle 1

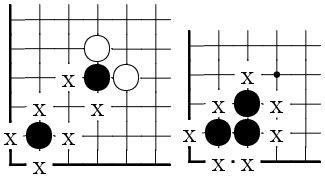
While traveling down Road 4.139π, you cross paths with a wizened Mobímon Trainer. After finally completing his **non-skippable seven-hour tutorial** on how to catch Mobímon, you try to slip away without him noticing. Alas, before you can make your excuses, he begins to tell you how Mobímon battles were fought **back in his day**.

Before Mobímon battles were limited to one-on-one matches, two trainers would send all their Mobímon into battle at once. Trainers would often practice battling by placing **black and white stones** on the **intersections of lines on a grid**, representing the positions of each trainer's Mobímon. The old man, not bothering to hide his frustration that you aren't showing any interest in this bit of history, insists on showing you the following examples.



The senile old coot explains that the left figure is an example of a single **group** because the stones are directly adjacent horizontally or vertically on the board, but the right figure represents three separate groups of stones.

To defeat a group of stones, it seems that you are required to **completely surround the group with your own stones**. As illustrated in the old man's next examples, the x's mark where white stones would need to be played to capture all the black stones.



Normally you **can't play a stone if it doesn't have some empty space next to it.** The one exception is that you can play a stone if that play **creates empty space by capturing your opponent's stones.**

You haven't really been listening, but then the old man mentions that he might be able to tell you where to **find some interesting Plant-type Mobímon** if you can solve a related **puzzle**. In each of the provided **Old-School Mobímon Battle Grids**, there is exactly one position where a stone could be played (white or black) to defeat a group of opposite-colored stones. Solve his puzzle by taking the boundary letters that match the color and position of the correct stone for each grid (and then get out of there before the old man can start another long-winded conversation!).

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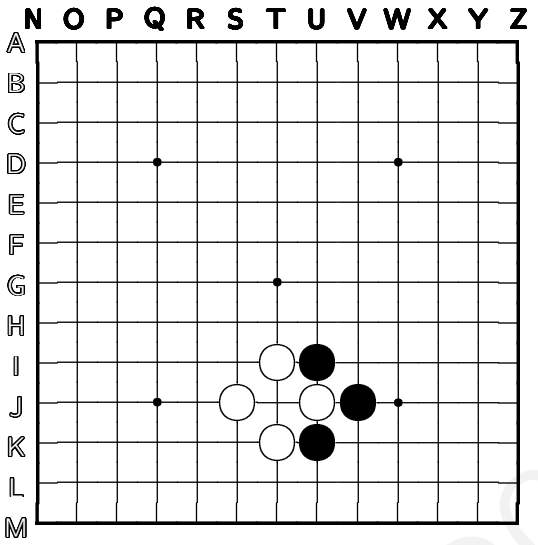
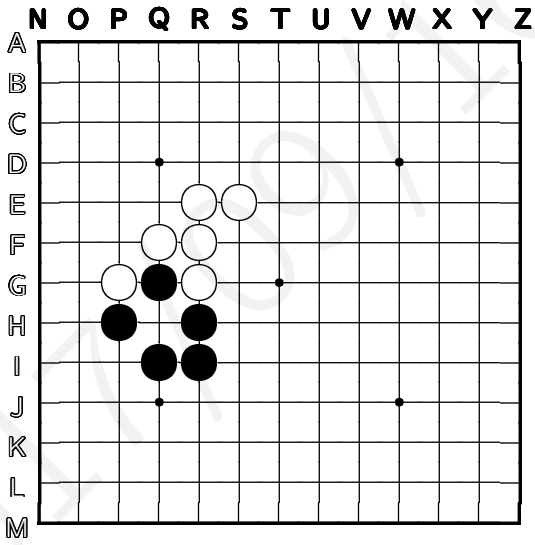
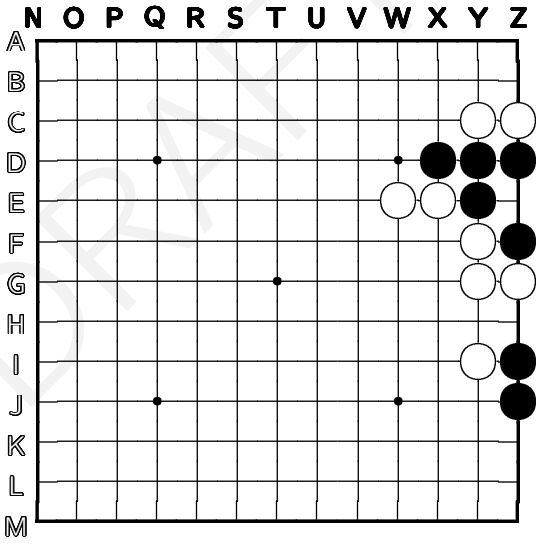
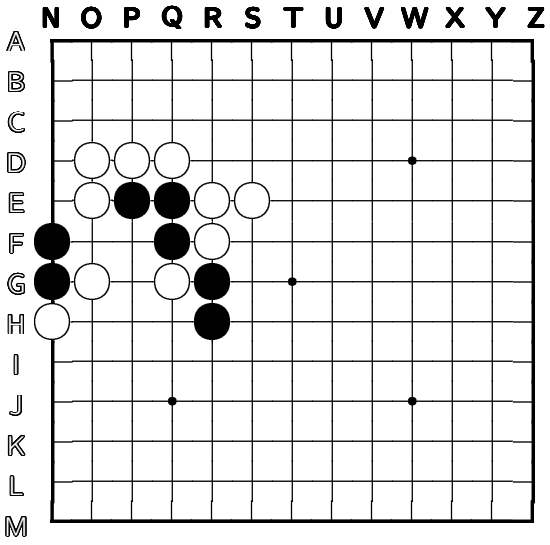
Go Get 'Em!

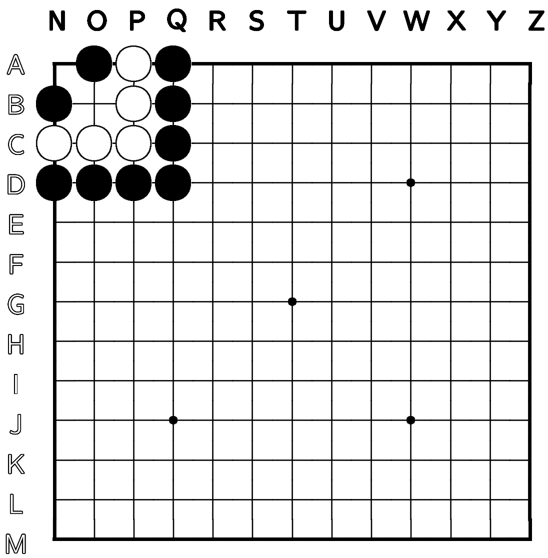
Old-School Mobímon Battle Grids

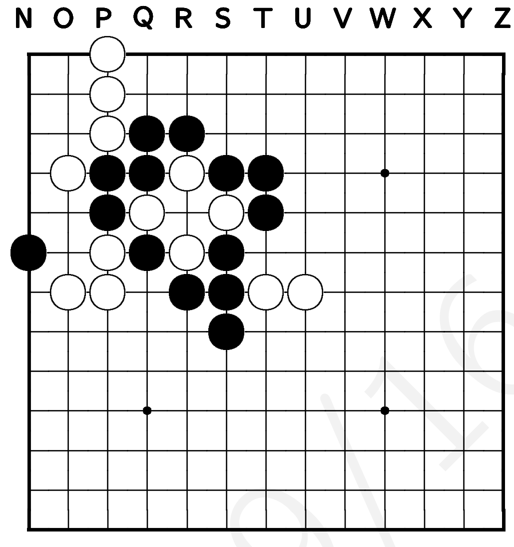


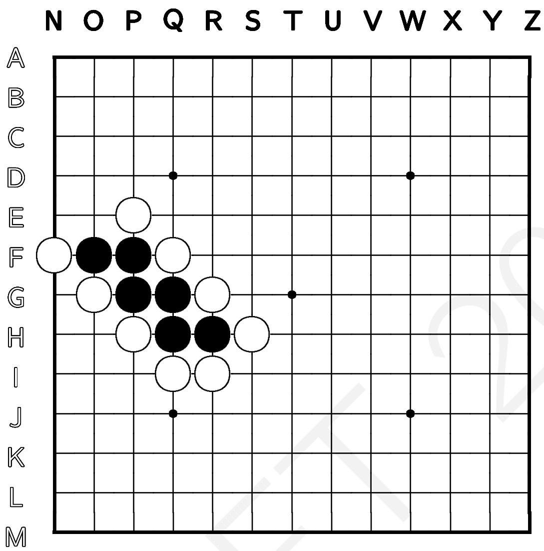


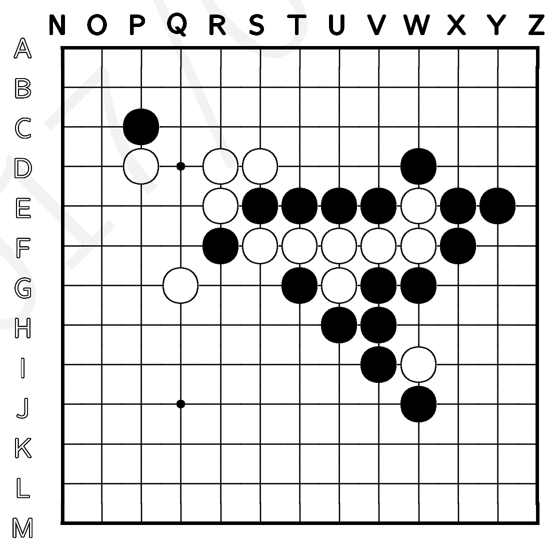


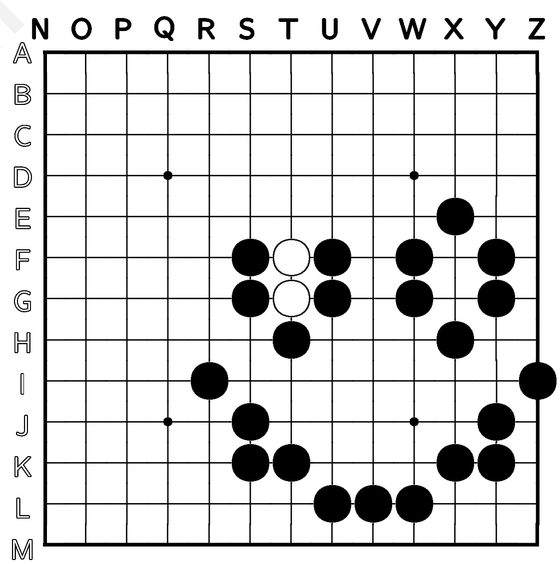












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When Push Comes to Shove

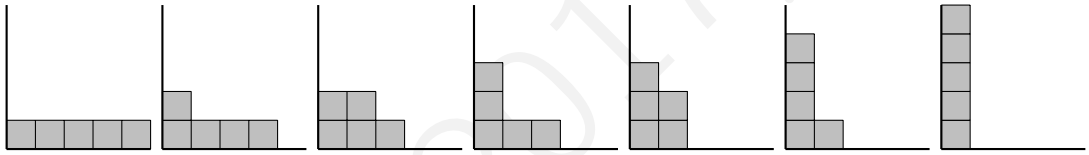
Main Puzzle 2

While training your Mobímon on Road $\sqrt{9^2 + 12^2}$, you are approached by **Dockworker Dave**, who challenges you to a Mobímon battle! Of course you accept... turning him down would be **rude**, don't you think?

It's a close match, but you win! As Dave gives you your victory money, he tells you about a group of **Tattarat** Mobímon that infest the warehouse he works in. These obnoxious critters like to **rearrange the boxes** in his warehouse, so Dave cuts you a deal. He'll let you catch a Tattarat for your team, but only if you help him reorganize his boxes.

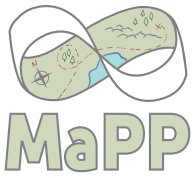
The boxes in the warehouse must be **stacked** so that each row of boxes is always pressed up against the **left wall** of the warehouse, and each row of boxes must have the **same or less boxes** than every lower row.

Other than that, it's up to you. For example, there are **seven** different ways to stack **five** boxes.



The dockworker notices your good work. "Hey, didya say you were aiming to become one of them Mobímon Champions? Maybe you're smart enough to solve this **puzzle** for me then." It seems that if you can count the following different combinations of stacked boxes, you'll be able to reveal a **hidden message** by converting the numbers to appropriate letters (A=1, B=2, and so on).

- The number of ways you can stack either 2 or 6 boxes.
- The number of ways you can stack 12 boxes, if every row must contain an odd number.
- The number of ways you can stack 8 boxes, if every row must contain less than eight.
- The number of ways you can stack up to 5 boxes. (An empty room counts as one way...)
- The number of ways you can stack 4 boxes.
- The number of ways you can stack 8 boxes, if every row must contain less than seven.
- The number of ways you can stack 13 boxes, if every row must have less boxes than the row below it.
- The number of ways you can stack 42 boxes, if you can only use one row.
- The number of ways you can stack 1 or 12 boxes, if every row must have a unique number of boxes.



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The Nickname Rater

Main Puzzle 3

As your adventure continues, you find yourself in **Achromatopsia City**, located at the end of Road 20.7183$-e$ and home of the famous **Nickname Rater**. She explains that while Trainers often like to give their Mobímon cute nicknames, she's very particular about the rules for an **excellent** nickname. For clarity, you can assume that a **vowel** is any of the letters `A/E/I/O/U`, and a **consonant** is any other English letter.

- Nicknames that contain **exactly one vowel**, that is, `A`, `E`, `I`, `O`, and `U`, are excellent.
- **Adding a consonant to the end** of an excellent nickname that **previously ended with a vowel** creates a new excellent nickname.
  - Examples: If `GOLE` is excellent, then `GOLEN` and `GOLEK` are excellent also.
- **Doubling** an excellent nickname creates a new excellent nickname.
  - Example: If `PIKA` is excellent, then `PIKAPIKA` is excellent also.
- **Replacing three consecutive vowels** in an excellent nickname **with a consonant** creates a new excellent nickname.
  - Example: If `QUEUEBONE` is excellent, then `QTEBONE` and `QURBONE` are excellent also.
- **Removing any double consonant** from an excellent nickname creates a new excellent nickname.
  - Example: If `DOUGTRIO` is excellent, then `DOUGIO` and `DOURIO` are excellent also.
- Any nickname that cannot be created by using the above rules is not excellent.

The Nickname Rater, not one to shy away from a good **puzzle**, offers you the chance to rate the following nicknames yourself. You'll know when you've done it correctly, because if you **use the first letters of the excellent nicknames below**, you will spell **another good word for a nickname** (even if it's not particularly **excellent** itself).

- `MANKAY`
- `ULTRAMON`
- `OMASTARE`
- `VOLTEON`
- `GENGASKHAN`
- `EEVOL`
- `NOHTYP`
- `BLASTMOIST`
- `ICHU`
- `KADABARA`
- `AERODYCTL`
- `PARACENT`
- `EARSEA`
- `DRAGONAT`
- `RAGMAR`

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Endless Enigmas

Main Puzzle 4

As you make your way down Road $\frac{6.4984}{\sin(20°)}$, you find a group of **Doppl** Mobímon in a patch of tall grass. At first the size of the group is **finite**, so you can count them in the usual way.

- $0 =$ no Doppl
- $1 =$ 
- $2 =$ 
- $3 =$ 
- $4 =$ 

However, before you know it, the size of the group grows to be literally **infinite**! Your Mobídex (an electronic guide used by most trainers) informs you that the lowercase Greek letter ω ("omega") is used to represent the shortest possible chain of infinitely-many Doppl.

- $\omega =$ 

As soon as they appeared, most of the Doppl **shrink** down to fill the available space. Now, there's still an ω-length chain of Doppl, but they look a little more like this.

- $\omega =$ 

Your Mobídex points out that while ω is the first **infinite number**, but it's not the only one! You see, bizzare as it sounds, there's always room for another Doppl to join the party.

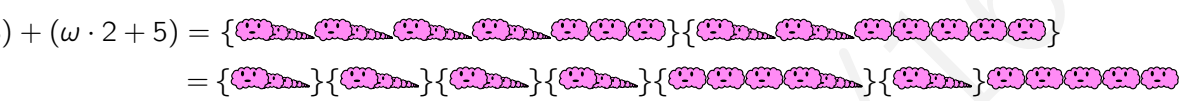
- $\omega + 1 =$ 
- $\omega + 2 =$ 
- $\omega + 3 =$ 

Suddenly, it gets really weird as you notice more infinite-length families of Doppl in the surrounding area. Your Mobídex is able to count a few of these groups.

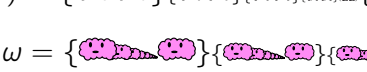
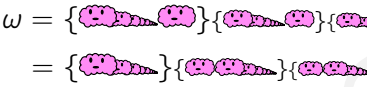
- $\omega + \omega = \omega \cdot 2 =$ 
- $\omega + \omega + \omega + 5 = \omega \cdot 3 + 5 =$ 
- $\omega + \omega + \omega + \cdots = \omega \cdot \omega = \omega^2 =$ 
  $=$ 

Your Mobídex points out that the rules of **arithmetic** behave differently when the numbers involved aren't all finite. (You suddenly remember your math teacher pleading with you to not use ∞ like it's a real number, and now realize why!)

When chains of Doppl are added together, a finite chain of Doppl will be absorbed into an infinite chain on its right, but not its left.

- $3 + 4 =$  $= 7$
- $7 + \omega =$  $= \omega$
- $(\omega \cdot 4 + 3) + (\omega \cdot 2 + 5) =$ 
  $= \omega \cdot 6 + 5$

The Mobídex informs you that Doppl chains can also be multiplied. When this occurs, each Doppl in the second factor splits into a copy of the Doppl chain given by the first factor.

- $3 \cdot 4 =$  $= 12$
- $(\omega + 1) \cdot 2 =$  $= \omega \cdot 2 + 1$
- $2 \cdot (\omega + 1) =$  $= \omega + 2$
- $(\omega + 1) \cdot \omega =$ 
  $=$  $= \omega^2$

Somehow you're not too shocked when your Mobídex tells you that there's a **puzzle** associated with counting Doppl. It's said that a Doppl's favorite Mobímon attack is 24007042951, but you'll need to solve the following Doppl arithmetic problems to figure out what that means in English!

$$(\omega + 3) \cdot (\omega + 5) = \omega^2 \cdot E + \omega \cdot G + S$$
$$\omega + 1 + \omega + 3 + \omega + 5 + \omega + 7 = \omega \cdot I + O$$
$$3 \cdot \omega + \omega^2 \cdot 5 + 4 \cdot (\omega^2 + 2) = \omega^2 \cdot L + \omega \cdot R + N$$
$$2 \cdot (2 + \omega \cdot 3) + (\omega \cdot 3 + 2) \cdot 2 = \omega \cdot A + M$$

Part IV

Bonus Puzzle

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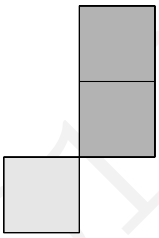
The Expedition Zone

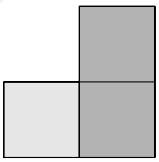
Bonus Puzzle

The **Expedition Zone**, found off the side of Road $6 + i^2$, is a great place to catch some rare Mobímon! You've been provided eleven **Mobí Nets** to set up in the Zone. There are a few rules to consider, however.

1. You may set up your nets in any order, but your first net must cover the **upper left corner** of the Zone.
2. All subsequent nets **must be connected at a corner** to a previous net, as in this example.



3. Nets **cannot connect along an edge** to other nets, as in this example.



You've been provided with an **Expedition Zone Map**. Each square on this map that contains a number represents a Mobímon with that much strength. **Maximize the sum of the numbers covered by your Nets**, and you'll prove you have what it takes to become a Mobímon Champion!

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The Expedition Zone

Expedition Zone Map

		3	9	9	9		1		6	1	
1	3		6	1	4	5	1	8	1		3
6	3	6	6	3	5	1		3	8	9	
	9		1	1	9	8	4	9	3		
5		5	8			4	8	7	6		7
	9		7	3		8	1		1	9	5
	4					1		6	5	5	
	5		6	9	2		9	8		5	4
	3			3	1	1	6	9	7		2
	6	8	7	3	5	2	1	3		8	5
2		5	1	9	9				9	2	6
7	6	5	4	4	3	8	1	9	2		1

Score:

500 - [ ] = [ ]

Sum of numbers not in Nets

Sum of numbers in Nets

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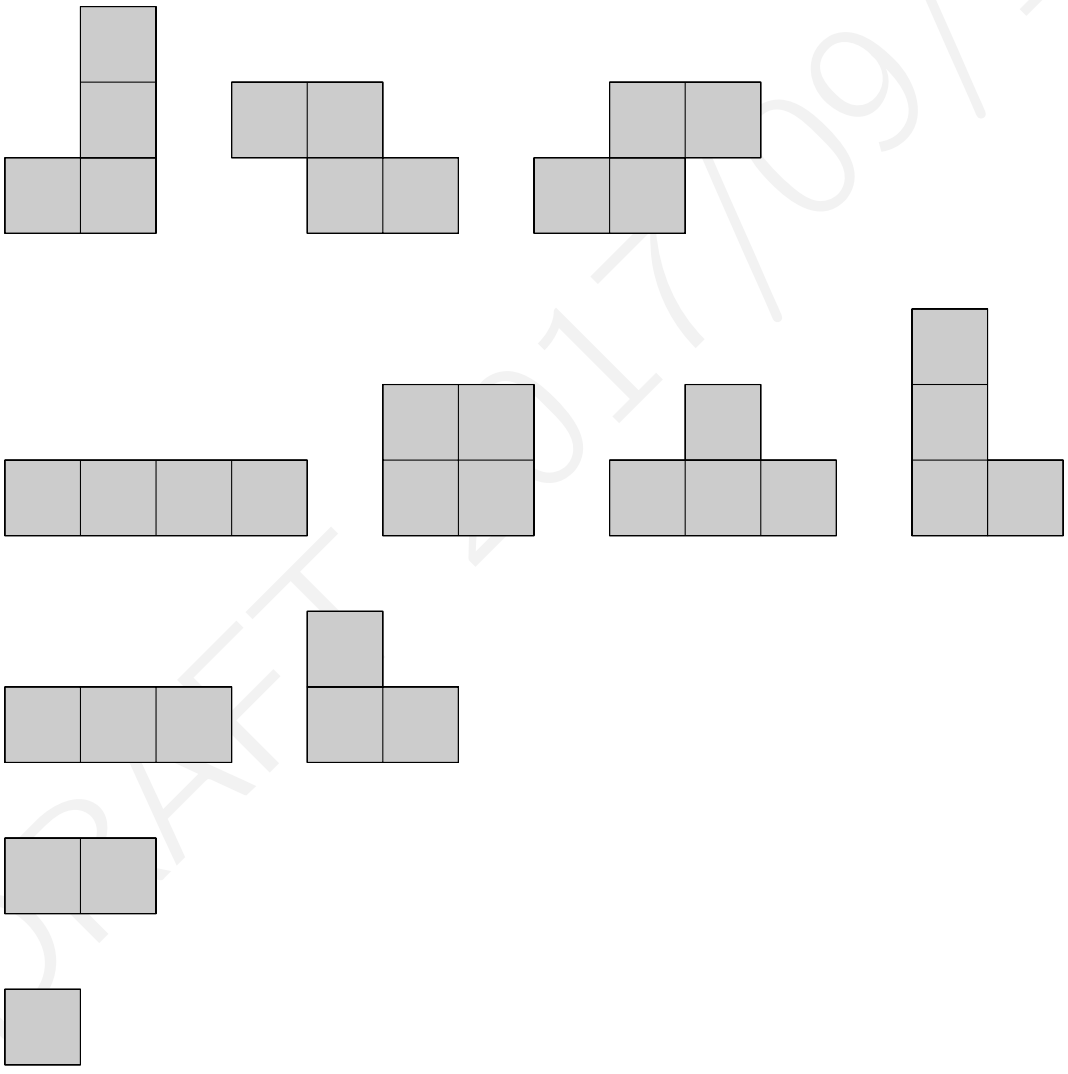
The Expedition Zone

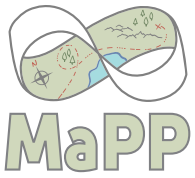
Mobí Nets

Cut out these figures and tape them to the **Expedition Zone Map**, following the rules outlined in the **Bonus Puzzle**.



Part V

Cryptic Puzzles



MaPP Challenge '18

Civic Duty

Cryptic Puzzle 1

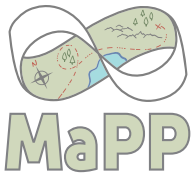
You finally slip away from the rambling Tutorial Man, but just your luck! A pack of Mobímon are blocking the path through Road ln(148.45).

- Dankgunk
- Burnie
- Glooble
- Electrumble
- Corporil
- Ayepey
- Hearit
- Forluxi

Luckily, the nearby Mobímon Center has **86 trainers** on staff, because they need **all of them** to tame these wild Mobímon.

- Glooble needs the fewest trainers.
- Corporil needs the most trainers.
- Electrumble and Hearit are the only pair that require the same number of tamers.
- The number of trainers needed by Dankgunk and Glooble differ by one.
- The number of trainers needed by Dankgunk and Electrumble differ by one, and add to nine.
- Ayepey, Burnie, Corporil, and Forluxi each need at least ten trainers.
- Ayepey needs a perfect square number of trainers.
- Ayepey, Burnie, and Forluxi each need an even number of trainers.
- Ayepey and Burnie's required trainer numbers share a prime factor.
- Burnie and Corporil's required trainer numbers share a prime factor.
- Corporil and Forluxi's required trainer numbers share a prime factor.
- But Corporil and Ayepey's required trainer numbers do not share a prime factor.

You start to offer your help, but are quickly rebuffed by the Mobímon Center's leader, a famous **Dojo Master**! "Hang on, young trainer! I'm afraid there's yet a certain **quality** you need to learn before you get yourself hurt." You're not sure what she means, but figure that the best way to find out is to start by calculating how many trainers each Mobímon requires.



MaPP Challenge '18

Cross Product

Cryptic Puzzle 2

Impressed with your problem-solving ability, the dockworker suggests you head to the Mobímon Dojo at the end of Road tan(87.4094°). There, the **Dojo Master** agrees to battle you, but only on one condition. He presents you a scroll with the following clues...

"Only a trainer that has one of these can possibly become HIPCONAM."

I	J	C	B	R	K	Y	W	R	O	K
L	I	L	Q	G	C	J	T	A	Y	H
A	D	O	A	R	Y	I	R	N	J	D
B	O	H	U	E	E	O	M	G	X	B
I	G	O	A	E	C	N	A	T	L	P
Z	Q	C	Q	P	H	T	Z	I	G	T
Y	A	P	O	F	E	M	A	G	Q	T
G	M	W	T	M	G	C	A	I	Q	K
O	D	G	G	L	Z	B	F	H	V	S
D	A	E	N	E	U	D	X	L	A	Q
W	K	Z	U	A	Y	E	F	N	J	W

Lightning × Plant Undead × Flame Aqua × Ordinary Flame × Magic

A voice belonging to your mentor echoes in your head... "The key to winning Mobimon battles is understanding how types match up." You know that some Mobimon types are weak against some types, while super effective against others. But you're not convinced that's what this scroll is referring to. Can you **unscramble** the meaning of the Master's scroll?

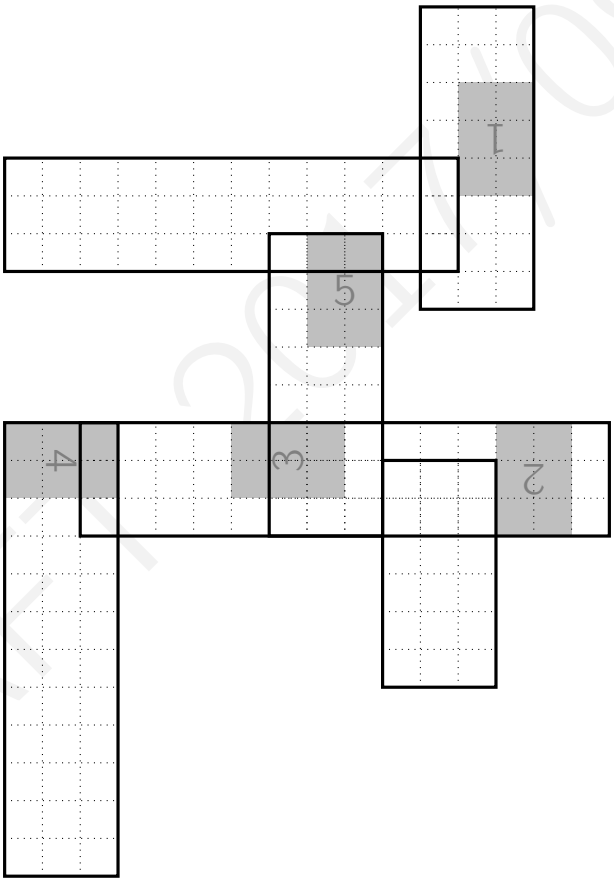
MaPP Challenge '18

Blind Luck

Cryptic Puzzle 3

The Nickname Rater suggests you continue your journey down Road 500%, where an elusive **Dojo Master** is known to battle up-and-coming trainers. You arrive at the dojo, but it seems that a secret password is required to enter, and your only clue is the following image.

RED BLUE YELLOW GOLD SILVER CRYSTAL



You'd move the **sun and moon** to figure out that password and battle the Dojo Master! Calmly, you **shut your eyes** and begin to ponder the solution to this mystery...

MaPP Challenge '18

Pin it Down

Cryptic Puzzle 4

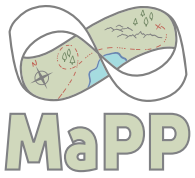
After figuring out the mysteries of the Doppl Mobímon, you realize that they are **trying to tell you something**. Could it be the location of a Mobímon Dojo?! (Of course it is.)

Sure enough, at the end of Road $\frac{19!}{18!}$, you find the **Dojo**. Its **Master** doesn't hestiate; as soon as you enter her lair, she sends out two of the most ferocious Mobímon you've faced yet!

She laughs arrogantly at your hesitation. "There's **something you must first become** before you can defeat my sweet Nohtyp and Doppl!" Mesmerized, you look for a clue in the arena, anything that can reveal what you want, no, need to be...

Part VI

Metapuzzle



MaPP Challenge '18

Faceoff with the Ultimiate Quartet

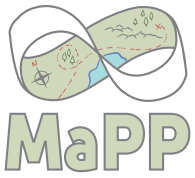
Metapuzzle

Before you head into the arena, your Mobímon mentor, Dr. Treename, suggests that you review this chart of advantages each Mobímon type (Ordinary, Flame, Aqua, Plant, Magic, Undead, and Lightning) has against each other type.

	O	F	A	P	M	U	L
O					1/2	1/2	1/2
F		1/2	1/2	2		2	
A		2	1/2	1/2	2		
P		1/2	2	1/2			2
M	1/2	2					2
U	1/2			2	2		
L	1/2		2			2	

Part VII

Appendex



MaPP Challenge '18

Solutions

Opening Puzzle - TODO

TODO

Main Puzzle 1 - Go Get 'Em

The correct stones are laid as follows.

- Black on JT - `T`
- White on HQ - `H`
- White on EZ - `E`
- White on FP - `F`
- Black on BO - `O`
- Black on ER - `R`
- White on EO - `E`
- Black on GS - `S`
- Black on ET - `T`

The solution is `THEFOREST`.

Main Puzzle 2 - When Push Comes to Shove

- `M=13=2+11` The number of ways you can stack either 2 or 6 boxes.
- `O=15` The number of ways you can stack 12 boxes, if every row must contain an odd number.
- `U=21=22-1` The number of ways you can stack 8 boxes, if every row must contain less than eight.
- `S=19=1+1+2+3+5+7` The number of ways you can stack up to 5 boxes. (An empty room counts as one way...)
- `E=5` The number of ways you can stack 4 boxes.
- `T=20=22-2` The number of ways you can stack 8 boxes, if every row must contain less than seven.
- `R=18` The number of ways you can stack 13 boxes, if every row must have less boxes than the row below it.
- `A=1` The number of ways you can stack 42 boxes, if you can only use one row.
- `P=16=1+15` The number of ways you can stack 1 or 12 boxes, if every row must have a unique number of boxes.

The solution is `MOUSETRAP`.

Main Puzzle 3 - The Name Rater

Since vowels are always doubled or subtracted by 3 when creating excellent nicknames, and the basic excellent nicknames have exactly one vowel, it is impossible for an excellent nickname to have a multiple of 3 vowels in a word. Thus all the words that have 3 vowels are not excellent (and the others can be verified to be excellent).

- **MANKAY** `4As->BA->B->BABBAB`
- *ULTRAMON* (3 vowels)
- **OMASTARE** `16As->ABABBABA`
- *VOLTEON* (3 vowels)
- *GENGASKHAN* (3 vowels)
- *EEVOL* (3 vowels)
- **NOHTYP** `16As->BABBBB`
- *BLASTMOIST* (3 vowels)
- **ICHU** `8As->ABBA`
- **KADABARA** `4As->BA->BABABABA`
- *AERODYCTL* (3 vowels)
- *PARACENT* (3 vowels)
- **EARSEA** `16As->AABBAABB->AABBAA`
- *DRAGONAT* (3 vowels)
- **RAGMAR** `4As->BA->BAB->BABBAB`

The solution `MONIKER` is another word for nickname (but is not excellent as a nickname, because it has 3 vowels).

Main Puzzle 4 - Endless Enigmas

$$(\omega+3)\cdot(\omega+5)=\omega^2\cdot E+\omega\cdot G+S=\omega^2\cdot 1+\omega\cdot 5+3$$
$$\omega+1+\omega+3+\omega+5+\omega+7=\omega\cdot I+O=\omega\cdot 4+7$$
$$3\cdot\omega+\omega^2\cdot 5+4\cdot(\omega^2+2)=\omega^2\cdot L+\omega\cdot R+N=\omega^2\cdot 6+\omega\cdot 0+8$$
$$2\cdot(2+\omega\cdot 3)+(\omega\cdot 3+2)\cdot 2=\omega\cdot A+M=\omega\cdot 9+2$$

This yields the solution `24007042951=MIRRORIMAGE`.

Cryptic Puzzle 1 - Civic Duty

This puzzle is solved by ordering the Mobímon alphabetically, then converting the required number of trainers for each using A=1,B=2, etc.

- Ayepey: $P=16$
- Burnie: $R=18$
- Corporil: $U=21$
- Dankgunk: $D=4$
- Electrumble: $E=5$
- Forluxi: $N=14$
- Glooble: $C=3$
- Hearit: $E=5$

The solution is `PRUDENCE`.

Cryptic Puzzle 2 - Cross Product

"Only a trainer that has one of these can possibly become HIPCONAM." `HIPCONAM` is an anagram of `CHAMPION`, hinting players to search for anagrams of the seven given words within the grid.

I	J	C	B	R	K	Y	W	R	O	K
L	I	L	Q	G	C	J	T	A	Y	H
A	D	O	A	R	Y	I	R	N	J	D
B	O	H	U	E	E	O	M	G	X	B
I	G	O	A	E	C	N	A	T	L	P
Z	Q	C	Q	P	H	T	Z	I	G	T
Y	A	P	O	F	E	M	A	G	Q	T
G	M	W	T	M	G	C	A	I	Q	K
O	D	G	G	L	Z	B	F	H	V	S
D	A	E	N	E	U	D	X	L	A	Q
W	K	Z	U	A	Y	E	F	N	J	W

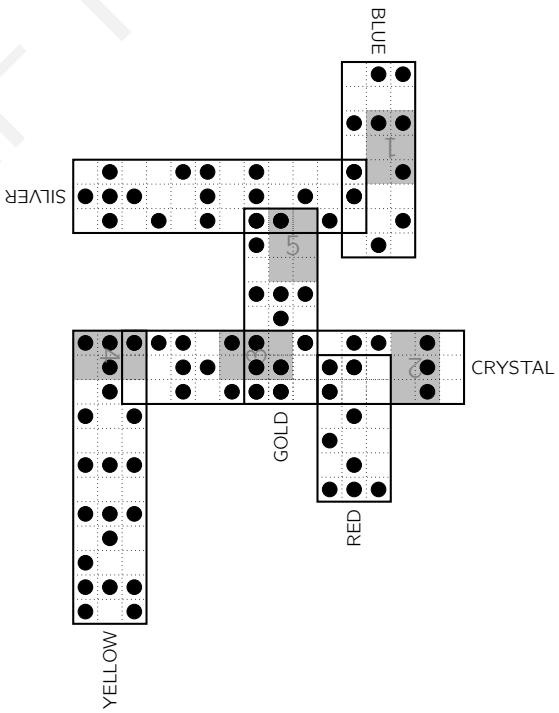
Each "cross product" represents the letter where the two words cross in the grid, yielding the following.

Lightning × Plant = T Undead × Flame = E Aqua × Ordinary = A Flame × Magic = M

The solution is `TEAM`.

Cryptic Puzzle 3 - Blind Luck

The blind/sight clues suggest to find a way to criss-cross the given words in the grid using Braille. There is exactly one way to do this, involving various orientations for each word.



The numbered regions 12345 yield the solution `ULTRA` in Braille.

Cryptic Puzzle 4 - Pin It Down

Overlaying the mirror images of the monsters reveals a message using the Pig Pen cipher (where the open circles represent no dot, and the filled-in circles represent a dot).

The solution is `VERYBEST`.

Metapuzzle - The Ultimate Quartet

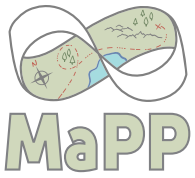
TODO: complete meta and write up solution

Hidden Puzzle

Each of the Roads referenced in Main Puzzles 1-4, the Bonus Puzzle, and Cryptic Puzzles 1-4 approximate to an integer between 1 and 26.

- $4.139\pi \approx 13 = M$
- $\frac{6.4984}{\sin(20^\circ)} \approx 19 = S$
- $\tan(87.4094^\circ) \approx 25 = Y$
- $\sqrt{9^2 + 12^2} = 15 = O$
- $6 + i^2 = 5 = E$
- $500\% = 5 = E$
- $20.7183 - e \approx 18 = R$
- $\ln(148.45) \approx 5 = E$
- $\frac{19!}{18!} = 19 = S$

`MORSEEYES` is not the solution, but a hint on how to find it. TODO: add special accents to Mobi prefixes throughout some part of the document available to players, spelling a solution in Morse code.



MaPP Challenge '18

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