MaPP Challenge '20 – Mystery of the Missing Archeologist

Mathematical Puzzle Programs

Version 2019/05/09

MaPP Challenge '20 – Mystery of the Missing Archeologist

How to Play

Rules

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.

Puzzle Packets and ClueKeeper

Each team has received multiple **Puzzle Packets**. However, there is not enough information in this packet to begin solving any puzzles.

Once the game begins, clues will become available in the **ClueKeeper** app that will allow players to begin solving puzzles in the packet. Once a puzzle is solved, its solution can be submitted via the app. As time progresses, hints for unsolved puzzles will unlock, helping teams who are stuck. The game ends when your time in ClueKeeper has expired.

The Bonus Puzzle solution is submitted directly to Game Control (not ClueKeeper) and is awarded partial credit, see below for details.

Main Puzzles

Once the game begins, you'll be presented with four mini-puzzles, each of which unlocks a **Main Puzzle**. If your campus is using Cluekeeper's GPS functionality, you will have take your device to a certain location on campus in order to unlock each puzzle.

Each Main Puzzle can be solved directly using mathematical modeling and problem-solving abilities. Each puzzle solves to a short word or phrase. Correct solutions are worth **1500 Victory Points each** for a total of **6000 Victory Points**.

Cryptic Puzzles

You will be given the opportunity to solve an additional **Cryptic Puzzle** after every Main Puzzle you solve. The way to solve these puzzles is left, well, cryptic. However, your team should still be able to use your critical thinking to extract a hidden word or phrase. Correct solutions are worth **500 Victory Points each**, for a maximum total of **2000 Victory Points**.

Bonus Puzzle

After solving all four Main Puzzles, the Bonus Puzzle will become unlocked in ClueKeeper. Your team will be asked to optimize a certain task, and present your solution to Game Control in person, which will be graded and awarded **up to 500 Victory Points**.

You may submit up to three solutions throughout the game (including any disqualified submissions), and your best solution of the three will be counted toward your score.

Metapuzzle

Once your team has solved two Cryptic Puzzles, the final **Metapuzzle** becomes available, worth **1000 Victory Points**.

Another Puzzle?

We cannot confirm nor deny the ability to earn an additional **500 Victory Points**, somehow.

Hints

Recreational teams may ask for hints at Game Control at any time during the game, and may receive direct assistance from their teachers/chaperones as desired. Competitive teams may ask Game Control for rules clarifications, but otherwise will only receive help via hints made availabe in ClueKeeper.

Winning the Game

The team that earns the **most Victory Points out of 10000** by the end of the game is the **winner**. If any teams are tied, then the tie will be broken based on how quickly those teams solved their puzzles (the time each team submitted its last correct non-Bonus puzzle solution).

Additional Rules/Advice

- 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.
- Before visiting Game Control to ask for a hint or clarification, make sure you've read all the material accompanying the puzzle! Chances are, your question is covered there.
- Teachers and chaperones are not allowed to help Competitive teams solve puzzles.
- Teams may use any supplies they've brought and even look things up online 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, and must always travel with a teammate when leaving their headquarters.
- 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 by MaPP!
- Contact Game Control immediately in the case of emergency or any issues with these rules.

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Game Resources

Reference Sheet

Letter	Decimal	Binary	Morse	Braille	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

Letter	Decimal	Binary	Morse	Braille	ROT13
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

Some famous numbers and formulas

$\sqrt{2} \approx$ 1. 41421 35623 73095 04880 16887 24209 69807 85696 71875 37694 80731 76679 73799 07324 78462 10703 88503 87534 32764 15727

$e \approx$ 2. 71828 18284 59045 23536 02874 71352 66249 77572 47093 69995 95749 66967 62772 40766 30353 54759 45713 82178 52516 64274

$\pi \approx$ 3. 14159 26535 89793 23846 26433 83279 50288 41971 69399 37510 58209 74944 59230 78164 06286 20899 86280 34825 34211 70679

Pythagorean Theorem

$$a^2 + b^2 = c^2$$

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Euler's Formula

$$e^{ix} = \cos(x) + i\sin(x)$$

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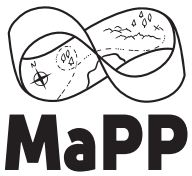
Opening Puzzle

The Numbers Text



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Main Puzzle 1

Billiards

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Main Puzzle 2

Bartering in the Market

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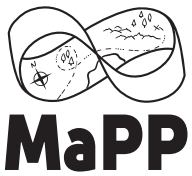
Main Puzzle 3

Searching the Tombs



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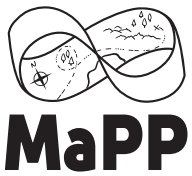
Main Puzzle 4

Ancient Gerrymandering



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Cryptic Puzzle 1

Word Graph Thing

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Cryptic Puzzle 2

Switchboard

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Cryptic Puzzle 3

???

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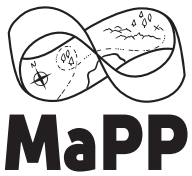
Cryptic Puzzle 4

???



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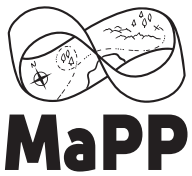
Bonus Puzzle

Azul Puzzle



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Meta Puzzle

Alien Conversation