TURING MACHINE

A game by **Yoann Levet** and **Fabien Gridel**

Learn the rules in mere minutes
scorpionmasque.com

British mathematician and cryptanalyst ***Alan Turing*** made a significant contribution to the advent of computers. We are offering you a chance to use a proto-computer, working without electricity or electronics, to find secret codes.

GOAL

Be the first to find the **only code** that will pass the test of all Verifiers. The code is made up of 3 numbers between **1** and **5**:

a ▲ number,
a ■ number,
and a ● number.

Each Verifier checks for one CRITERION.
For example, "***The ● number is odd***."
Once you have deduced all the criteria, you can figure out the only code that will satisfy them all.
For solitaire play or coop, see the **SOLO AND COOPERATIVE MODES** section, p. 8.

SETUP FOR YOUR FIRST GAME

SOLO AND COOPERATIVE MODES
To play solo (or cooperatively with other players), read Solo and Cooperative Modes on the last page of this booklet.

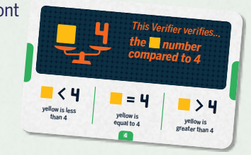
1. Place the Machine tile in the centre of the table.

2. Assemble the punch-card support.
Do not take it apart at the end of the game; store it in the box as is.

3. Place the punch cards in the support:
all cards **1** in the front, followed by all **2** and so on.

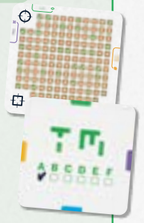
4. Choose a Problem to solve (on the next page).
Numbers **01** to **16** are introductory problems, perfect for new players. You can also find millions more problems online.
We will use problem **01** for our setup example.

5. Place the Criteria cards in front of their assigned Verifier.
   - Verifier **A**: card **4**
   - Verifier **B**: card **9**
   - Verifier **C**: card **11**
   - Verifier **D**: card **14**



Verifier:
In this game, a Verifier is a 'fictional person', a form of artificial intelligence. It's not a player!

6. Place the Verification cards face down in front of their assigned Verifier (next to the Criteria card).
   A: 447 **B**: 646 **C**: 566 **D**: 322

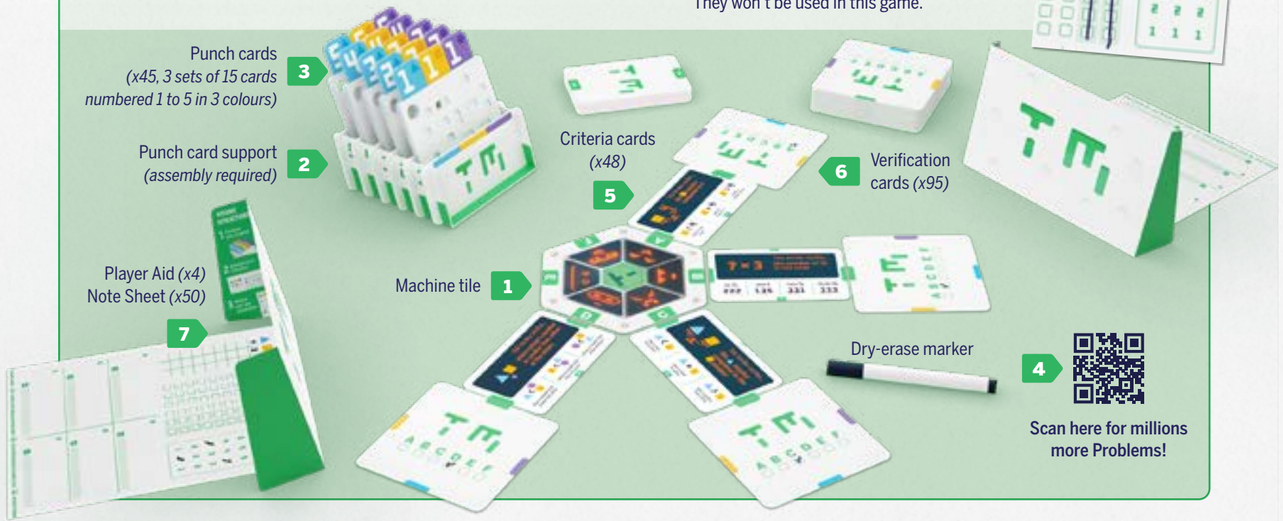


Note that each Verification card can be used for 4 different numbers and 4 different colours.

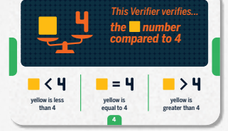
To avoid mistakes, tick the corresponding letter on the back of each Verification card (**A**, **B**, **C** or **D**).

7. Give a Player Aid (which doubles as a screen) and a note sheet to each player. If you are playing a game from the online app, note down the number of the game.

Draw a line through Verifier columns **E** and **F**. They won't be used in this game.



PROBLEMS



710 304 715 302

Difficulty Factor ✪ / Luck ♣ | **A** Verifier | **4** Criteria cards | Verification cards

01 ✪ ♣♣♣		02 ✪ ♣♣♣		03 ✪ ♣♣♣		04 ✪ ♣♣♣		05 ✪ ♣♣♣	
A	4 447	A	3 564	A	4 677	A	3 662	A	2 413
B	9 646	B	7 355	B	9 217	B	8 790	B	6 532
C	11 566	C	10 635	C	13 634	C	15 404	C	14 596
D	14 322	D	14 720	D	17 528	D	16 509	D	17 537

06 ✪ ♣♣♣		07 ✪ ♣♣♣		08 ✪ ♣♣♣		09 ✪ ♣♣♣		10 ✪ ♣♣♣	
A	2 437	A	8 356	A	3 631	A	1 357	A	2 224
B	7 405	B	12 695	B	5 252	B	7 610	B	6 543
C	10 378	C	15 329	C	9 219	C	10 463	C	8 793
D	13 797	D	17 618	D	15 349	D	12 399	D	12 757
				E	16 374	E	17 393	E	15 687

11 ✪ ♣♣♣		12 ✪✪ ♣♣		13 ✪✪ ♣♣		14 ✪✪ ♣♣		15 ✪✪ ♣♣	
A	5 445	A	4 335	A	11 279	A	2 585	A	5 763
B	10 639	B	9 362	B	16 515	B	13 228	B	14 598
C	11 289	C	18 421	C	19 770	C	17 647	C	18 223
D	15 406	D	20 747	D	21 523	D	20 268	D	19 317
E	17 484							E	20 520

16 ✪✪ ♣♣		17 ✪✪✪ ♣		18 ✪✪✪ ♣		19 ✪✪✪ ♣		20 ✪✪✪ ♣	
A	2 778	A	21 341	A	23 681	A	19 237	A	11 287
B	7 654	B	31 432	B	28 244	B	24 353	B	22 533
C	12 614	C	37 706	C	41 440	C	30 204	C	30 389
D	16 640	D	39 495	D	48 737	D	31 423	D	33 486
E	19 751					E	38 606	E	34 547
F	22 485							F	40 615

ONLINE PROBLEMS

This booklet contains 20 problems to solve, or 20 games... But you will find literally millions more on the Turing Machine website!!

Scan the QR code here or go to turingmachine.info

For problems that work with the rules as presented here, choose the '**Classic**' mode.

You will also find **2 new, more challenging modes of play**.
- The first, called '**Extreme**,' has 2 cards in front of each Verifier (but only one valid criterion amongst those presented on the 2 cards).
- In the second mode, called '**Nightmare**', you do not know which Verifier is associated with which Verification card.

SOLUTIONS

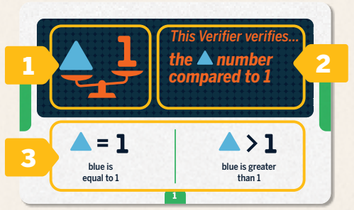
01:241	02:435	03:331	04:345
05:354	06:512	07:241	08:423
09:344	10:242	11:325	12:111
13:111	14:422	15:253	16:243
17:133	18:331	19:224	20:411

GAMEPLAY

Unlike many deduction games, you won't be questioning the other players, but a machine. This machine consists of 4 to 6 Verifiers, a kind of artificial intelligence.
Each verifier checks for one single aspect, one single criterion.

Questioning a Verifier consists of asking them if your proposal passes their test.
It's up to you to figure out what you need to do to 'pass' their test; which criteria you must respect.

Anatomy of a Criteria card



1. Icon indicating what the Verifier knows.
2. Written explanation of the precise element the Verifier is checking for.
3. List of possible criteria this Verifier is checking for. You have to find which is the right one!

ADVANCED STRATEGY:
All the Verifiers are essential to finding the final code. No Verifier will repeat information given by another. After a few games, you will notice that this bit of information will allow you to be more efficient in your deductions. You will understand, right from setup, that there are certain questions you will not need to ask.

ROUND STRUCTURE

The game is played in rounds, each one identical. All players will, individually and simultaneously, do the following steps:

1. **Compose your Proposal.**
2. **Question.**
3. **Deduce.**
4. **End of Round.**

1. COMPOSE

Compose your 3-digit proposals by overlaying 3 different-coloured cards: a ▲ number, a ■ number and a ● number.
In the rare case that a particular card you need is being used by another player, simply wait until they are done before taking it.

2. QUESTION

You will question up to 3 Verifiers over the course of a round, without changing your proposal.
Place the Verifier's Verification card under your proposal, making sure it is properly lined up with the punch cards using these symbols in the corners: ○ □ △

Each Verifier will tell you if your proposal **passes** or **fails** their test.

The Verifier's Answer
You'll notice that only one hole appears when you overlap the 3 punch cards to make your proposal. It's through this hole that you'll see the Verifier's answer.

If the Verifier answers ✅, your proposal has **passed their test**.

If the Verifier answers ❌, your proposal has **failed their test**.

Mark a ✗ or a ✓ in the corresponding space on your note sheet.

Recap
Once you have made your 3-digit proposal, you will decide which Verifiers to question. Questioning a Verifier means asking if your proposal respects their criterion or not; if your proposal passes their test or not. The criteria that each Verifier is checking could be as simple as, "*the ● number is even*." The criterion that will allow you to pass the Verifier's test is one of those listed on the bottom of each Criteria card.

The answers the Verifier gives you will not give you information about the code, but only about the criteria they are verifying.

Let's imagine that the criteria of Verifier **A** is "*The ● number is greater than 3.*" Here are some examples of answers to different proposals:

Only the proposals where the ● number is GREATER than 3 get a positive answer ✅.
The other numbers mean nothing in this example; they are not what is being verified.

3. DEDUCE

Put your punch cards back in the support and analyse your answers. Write down your deductions on your note sheet. Determine if you have found the code or not.

4. END OF ROUND

Once all players have asked their questions and completed their deductions, everyone extends their closed fist and counts to 3 simultaneously. On 3, point **your thumb** either up or down at the same time as everyone else.

- **Point upwards** if you think you have found the code.
- **Point downwards** if you have not yet found it.

If nobody has pointed upward, start a new round.

If one or more players has pointed upward, go to the **VERIFICATION AND END OF GAME** section.

VERIFICATION AND END OF GAME

If one or more players think they have found the code, **they should write it secretly (and clearly!) on their note sheet**. Each one then checks, in turn, the **SOLUTIONS** section at the bottom of p. 3 in this booklet, or uses the appropriate button in the application, and verifies if their code is correct.

If more than one person is correct, **the one who found the code asking THE FEWEST questions wins**.
This is why keeping track of all your answers is so important (writing ✓ or ✗). If it is still tied, all tied players win. Prove your code is correct by composing it with the punch cards and then making sure it passes the tests of all the Verifiers!

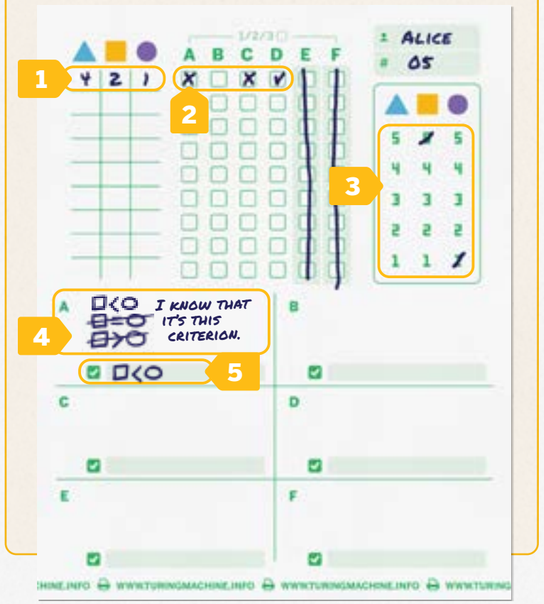
If nobody has found the correct code, **the players who were incorrect are eliminated**, and the game continues for the other players. If there is only one player remaining, they win by default!

When the game is over, don't forget to erase the ✓ on the back of the **Verification cards**.

NOTE SHEETS

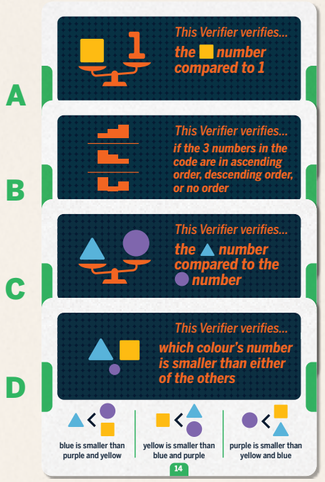
Learn how to take good notes if you want to win!

1. Each round, write your proposal on the line of the current round.
2. Write the answers you got (✓ or ✗) from each Verifier in the proper column. **This is obligatory, and keeps track of the number of questions you've asked**.
3. Use this section to cross off any numbers you've eliminated.
4. Use the bottom section to write down all the information you've learned about each.
5. Write the Verifier's criterion in this space once you have identified it.



EXAMPLE OF PLAY

Show this example to anyone who is learning the game. Here is a problem with 4 criteria:



In the first round, you put together this proposal and you write it on your note sheet.

Verifier **A** verifies one criterion. This criterion could be either "***The ■ number is equal to 1***" or "***The ■ number is greater than 1***."

You question **A**. You take their Verification card and place it under your 3 punch cards. You see ✅ in the hole. Your proposal has passed their test! So **A**'s criterion is "***The ■ number is greater than 1***," because the ■ number in your proposal (3) is greater than 1, and you passed the test.

This does NOT mean that the ■ number is 3! Verifier **A** doesn't know what the value of ■ is, they just know that ■ is greater than 1. If you'd put 2, 3, 4, or 5 ■, **A** would have answered ✅.

Write your answer on your note sheet: write ✔ under **A**, next to your proposal.

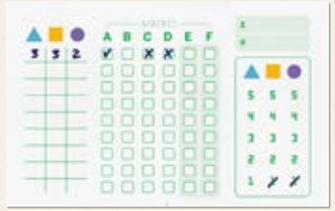
Put the Verification card back, face-down. Because you have identified **A**'s criterion, you won't need to question them again; you'll get no new information from them.

You then question Verifier **D** with the same proposal (which you need to keep for the whole round).
They answer ❌. What does that mean?

D verifies one thing only: which of ▲, ■, ● is the smallest. In your proposal, ● is the smallest, and this does not pass **D**'s test. You can deduce that the smallest is either ▲ or ■.

Finally, you decide to question **C**. They verify one of 3 criteria: either ▲ is greater than ●, or ▲ is smaller than ●, or ▲ is equal to ●. **C** answers ❌ to your proposal. **C**'s criteria is not "***the ▲ number is greater than the ● one***." There are therefore 2 remaining possibilities: EITHER the ▲ number is the same as the ● number, OR the ▲ number is less than the ● one.

You can't ask any more questions this round.



REMINDERS AND CLARIFICATIONS

Game Order:
Compose your proposal and question Verifiers at the same time as the other players.

There aren't enough punch cards:
In the rare case that you need an unavailable punch card, simply wait until another player has finished using theirs to take it.

Don't get mixed up:
Put the Verification cards back in front of the correct Verifier immediately after you have finished questioning the Verifiers!

Number of Questions per round:
You can question a maximum of 3 Verifiers per round, but you can always question fewer than 3.

You must keep the same proposal for the entire round:
It is **obligatory** to write down on your note sheet your proposals and the answer to ALL the questions you ask. This will serve to determine the winner in case of a tie.

Strategy:
You will need the criteria of all the Verifiers to find the code. No criterion is superfluous.

Only one code respects all the criteria.

Public and Secret information:
Your proposal and the Verifiers you question are visible to everyone. Keep your answers and notes **secret**.

CRITERIA CARD EXPLANATIONS

At the beginning of every game, take the time to discuss and understand the meaning of each Criteria card. To help with this, here are some remarks and clarifications for each card. Cards with very similar structures have been grouped together in this list.

Card 1
To pass the test of this Verifier, you must find if the ▲ number is equal to or greater than 1.
Watch out! If the ▲ number in your proposal is 3 and you get a ✅ this does NOT mean that the ▲ number is 3, it only means that it must be greater than 1 (and not equal to it).

Cards 2 to 4
These cards work in a very similar way to Card **#1**, but there are now 3 possibilities. In Card **#2**, the ▲ number can be either **less than**, **equal to**, or **greater than** the number indicated.
Watch out! If the ▲ number in your proposal is 2 and you get a ✅, this does NOT mean that the ▲ number is 2, it only means that it must be less than 3.

Cards 5 to 7
To pass this test, find if the ▲ number has to be **even** (2 or 4) or **odd** (1, 3, or 5).

Cards 8 to 10
The Verifier verifies that there is a precise number (that they know) of 1s in your proposal. For example, they can verify that there are two (no more, no less). In this case, the code can be 113, 151, 411, etc.

Cards 11 to 13
These cards work similarly to cards **2** to **4**, but instead of comparing a number in your proposal to another specific number, it is comparing two numbers within your proposal. For example, the ▲ number with the ■ number.
Watch out! If you get ✅ if your proposal is 3 ▲ and 3 ■, this does NOT mean that the numbers are 3, just that they have to be the same.

Cards 14 to 15
The Verifier verifies that the number of a particular colour (that they know) is smaller than all the other numbers.

Card 16
The Verifier verifies that there are more of either **even** (e.g.: 454) or **odd** (e.g.: 341) numbers in the code.

Card 17
The Verifier verifies that there is a precise number (that they know) of even numbers in the code: **zero**, **one**, **two**, or **three**.

DO YOU THINK THE MACHINE HAS MADE A MISTAKE?
If you are playing with the game's more difficult cards (identified by ⚠ in this list) and you think that the machine has made a mistake in its answers, you are probably a victim of 'The 'X' Paradox'.
Scan this code to find out all about it!
turingmachine.info

Card 18
The Verifier verifies that the sum of all the numbers in the code is either **even** or **odd**.

Card 19
These cards work like cards **2** to **4**, but the Verifier compares the sum of the ▲ and ■ numbers to 6. This sum can be **less than**, **equal to**, or **greater than** 6.

Card 20
The Verifier verifies if a number repeats itself, and if it so, how many times. There may be **no repetition** (e.g.: 125), one number **repeats itself once** (e.g.: 121), or a number **repeats itself twice** (e.g.: 222).
If a number repeats itself, the Verifier does not know anything about it. They don't know the colour (if it's ●) or its number (a 2 or a 3, etc,).

Card 21
The Verifier verifies that there is either **one pair** of identical numbers (e.g.: 313), or **no pairs** of identical numbers (e.g.: 231, or 333 - which is not exactly a pair). If there is a pair, the Verifier does not know anything about it. They don't know the colour (if it's ●) or its number (a 2 or a 3, etc,).

Card 22
The Verifier verifies that the three numbers are in either **ascending order**, **descending order**, or **neither.** For example, 223 is not ascending (because the three numbers do not ascend, only two).

Card 23
This card works in the same way as **19**, but the Verifier compares the sum of all the numbers with 6.

Card 24
The Verifier verifies that in the code there are consecutive increasing values in either a **2-digit sequence** (e.g.: 312), or a **3-digit sequence** (e.g.: 345), or **none at all** (e.g.: 132 - in this example the 1-3 sequence is increasing, but 1 and 3 are not consecutive numbers.).

Card 25
The Verifier verifies that there are either increasing or decreasing values in a **2-digit consecutive sequence** (e.g.: 312 or 254), a **3-digit consecutive sequence** (e.g.: 345 or 321), or **none at all**. (e.g.: 135 or 531 - in this example the 1-3 sequence is increasing, but 1 and 3 are not consecutive numbers).
The Verifier does not know if the sequence is increasing or decreasing.

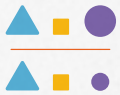
Cards 26 to 27 ⚠
The Verifier verifies that the number of a particular colour (that they know) is **less than** 3 (e.g.: the ■ number is less than 3).
Watch out! If the criteria is 'the ■ number is less than 3', the other colours' numbers can also be less than 3... the Verifier is just not verifying that.

continued...

Cards 28 to 30
The Verifier verifies that the number of a particular colour (that they know) is 1. (e.g.: The ▲ number is 1.)
Watch out! The other colours' numbers can also be 1... the Verifier is just not verifying that.

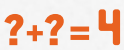
Cards 31 to 32
The Verifier verifies that the number of a particular colour (that they know) **is greater than 1**.
Watch out! The other colours' numbers can also be greater than 1... the Verifier is just not verifying that.

Card 33
The Verifier verifies that the number of a particular colour (that they know) is **odd** or **even**. (e.g.: The ▲ number is even.)
Watch out! The other numbers can also be even (or odd, depending).



Cards 34 to 35
The Verifier verifies that the number of a particular colour is **less than** or **equal to** all the other numbers. (e.g.: They verify that no other colour is less than ■.)

Card 36
The Verifier verifies that the sum of all the numbers in the code is a **multiple of 3**, or a **multiple of 4**, or a **multiple of 5**.



Cards 37 to 38
The Verifier verifies that the sum of two particular numbers (that they know) is 4.

Cards 39 to 41
The Verifier verifies that the number of a particular colour (that they know) is **less than**, **equal to**, or **greater than** 1.

Card 42
The Verifier verifies that the number of a particular colour (that they know) is either **less than** or **greater than** either of the others (e.g.: The ■ number is greater than the others).

Cards 43 to 44
The Verifier verifies that the ▲ number is **less than**, **equal to**, or **greater than** another particular number (that they know).

Cards 45 to 47
The Verifier verifies that the number of 1s or the number of 3s in the code is **equal to** a particular number (that they know).

Card 48
The Verifier verifies that that the number of a particular colour (that they know) is either **less than**, **equal to**, or **greater than** that of another particular colour (that they know). (e.g.: the ■ number is greater than the ● number.)

SOLO AND COOPERATIVE MODES

TAKE ON THE MACHINE!
Go to **turingmachine.info** and select a problem you'd like to solve. On your own or in a team, solve the problem in the fewest rounds (and questions) possible, using only one note sheet.

When you have found the code, click on "**Did you beat the MACHINE?**"
You will discover how many rounds and questions our artificial intelligence took to find the code. To win, you must have done as well as or better than the Machine.

Watch out! Like in the regular game, you can only ask a maximum of 3 questions per round.

Share your successes on social media with the hashtag ***#turingmachinegame***

HANDICAP SYSTEM

If an experienced player is playing against newer players, we strongly recommend using this system to level the playing field. In the first round (and only the first), the experienced player fills in a number of answer squares. These squares count as questions the player would have asked (leaving fewer for the player to ask in the first round).
Fill in 1 square if the difference in experience/skill is slight, and 2 squares if the difference is greater.
For example, in the latter case, the player could only ask one question in the first round, because there are 2 squares already filled in!

Publisher: Christian Lemay
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20′ 14+ 1-4

We finance the replanting of all trees used in the production of our games.

Scorpion Masqué

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