Reasoning — Reasoning Tasks

Reasoning- Definition

Reasoning is the ability to think carefully and logically in order to solve problems, make decisions, or understand relationships between things.

Generic Reasoning Task Instructions (for both adolescents and adults)

Welcome to the "Reasoning Challenge"!
This game will test how quickly and smartly you can think!

You'll see **different types of puzzles** — some with words, some with numbers, and some with rules or clues.

Each puzzle helps test your **thinking speed**, **logic**, and **problem-solving ability** — like a mini brain workout!

 How to Play:

- Read each question carefully.
- Tap the answer that you think fits best.
- Once you choose, the next puzzle appears automatically.

 You'll have 15 minutes in total to complete all the reasoning puzzles — so stay alert and keep moving!

Some will be easy, some tricky — but remember, every second counts!
Ready to see how strong your reasoning power is?

 Tap **"Let's Go!"** when you're ready to begin your challenge!

Task Structure:

In this session, the reasoning assessment is **divided into three types of tasks**:

1. **Deductive Reasoning Task**
2. **Analogical Reasoning Task**
3. **Numerical Matrices Task**

1) Deductive Reasoning – Deductive Reasoning Tasks

Deductive Reasoning-Definition:

Deductive reasoning is the ability to draw logical conclusions from given facts, statements, or general rules

Deductive Reasoning Task – Definition

The Deductive Reasoning Task measures participants' ability to apply logical rules to evaluate whether a conclusion logically follows from two given premises. In each trial, participants read two statements (premises) and then decide if the conclusion presented below them is logically valid based on those premises.

For Tech team's Reference:

1. **Task Overview**

Number of Rounds: 23 rounds (for both adolescents and adults)

Trial types (examples):

1. **Valid —** conclusion logically follows ⇢correct response Yes.
2. **Invalid —** conclusion does not follow from premises ⇢correct response No.

a. **Contradicted** — conclusion contradicts the premises ⇢correct response No.

b. **Undetermined** — premises are insufficient to decide ⇢correct response No.

Options given for this task for both the versions:

Note for experimenters: "Yes" = Valid only. Any other case (contradiction, indeterminate, insufficient information) = "No".

2. Rounds Flow

1. The participant first reads the Main Task Instructions

Adolescents (14–18 years)

"Welcome to **Logic Detective!**
You'll see two clues (statements) and then a conclusion with a question mark.
Your job is to decide if the conclusion **must be true** based on those clues.
Example: **Statement 1:** All fruits are healthy.

Statement 2: All apples are fruits.

Conclusion: All apples are healthy?

✓**Correct answer:** Yes — this conclusion **logically follows** (valid categorical syllogism).

Tap **'Yes'** if the conclusion must be true.
Tap **'No'** if it doesn't logically follow or if the information is uncertain.

Some rounds will be simple, others will twist your brain a little.
Be fast, be sharp, and think like a detective!"

Tap *Let's Go!* to begin!"

Adults (18-22 years)

“Ready to test your reasoning skills?
In this task, you’ll play **Logic Quest** — a challenge where you must decide if conclusions truly follow from given facts.
Each round gives you **two premises** (facts or rules) and a **conclusion** with a question mark.
Your goal: figure out whether the conclusion is **logically true,**.

Example: Statement 1: All poets are creative people.

Statement 2: Some writers are poets.

Conclusion: Some writers are creative people?

✅**Correct answer:** Yes — conclusion logically follows

Tap **‘Yes’** if the conclusion must be true.
Tap **‘No’** if it doesn’t logically follow or if the information is uncertain.

Stay alert — some conclusions sound convincing but aren’t truly logical.
Let’s see how sharp your reasoning is!”

Tap *Let’s Go!* to begin!”

2. Participants then proceed to the Main Task

Main Task Round level Flow (applicable for both adolescents and adults version)

1. **Stimulus display in the given format below**

Statement 1: All teachers work in schools.

Statement 2: Mr. Ravi is a teacher.

Conclusion: Mr. Ravi works in a school ?

Response Options:

- Two response buttons appear below the text in the following format:
  - [Yes]
  - [No]

Response Window:

- If the participant selects an option, the system moves to the next round.

Next Round Begins.

Deductive Reasoning Flow Table- Adolescents Version (to be displayed in the interface in the same order).

Round No.	Statement A	Statement B	Conclusion	Options	Answer	Reasoning Type	Validity
1	All moons orbit around planets.	All planets orbit around galaxy	All moons orbit around galaxy	Yes/No	Yes	Syllogistic	Valid
2	No reptiles are warm-blooded.	All Turtles are reptiles.	No Turtles are not warm-blooded.	Yes / No	No	Syllogistic	Invalid
3	All birds are animals	Some penguins are birds	Some penguins are animals	Yes / No	Yes	Syllogistic	Valid
4	Some students play kho-kho.	No kho-kho players are musicians.	Some students are not musicians.	Yes / No	No	Syllogistic	Invalid

5	All books are kept in the library	All encyclopedias are books.	All encyclopedias are kept in the library	Yes / No	Yes	Syllogistic	Valid
6	No mammals can swim.	All Camels are mammals.	No camels cannot swim.	Yes / No	No	Syllogistic	Invalid
7	No snakes have legs.	All cobras are snakes.	No cobras have legs.	Yes / No	Yes	Syllogistic	Valid
8	Some Western languages have scripts.	Some Indian languages don't have scripts.	Some Indian languages have scripts.	Yes / No	No	Syllogistic	Invalid
9	All social media apps require the Internet.	All Whatsapp Accounts are social media apps.	All Whatsapp Accounts require the Internet	Yes / No	Yes	Syllogistic	Valid
10	No animals can talk	All Dogs are animals	No Dogs can talk	Yes / No	Yes	Syllogistic	Valid
11	No birds are insects.	Some parrots are birds..	Some parrots are not insects.	Yes / No	Yes	Syllogistic	valid
12	No bakers are painters	All residents in Bangalore are bakers	No residents in Bangalore are painters	Yes / No	Yes	Syllogistic	Valid

13	No messy desks are organized desks.	All organized desks are classroom desks.	Some classroom desks are not messy desks.	Yes / No	Yes	Syllogistic	Valid
14	All poets are artistic.	No psychology students are artistic	No Psychology students are poets.	Yes / No	Yes	Syllogistic	Valid
15	All snakes are venomous.	No frogs are venomous	No frogs are snakes.	Yes / No	Yes	Syllogistic	Valid
16	No tablets are smartphones.	Some laptops are smartphones.	Some laptops are not tablets	Yes / No	No	Syllogistic	Invalid
17	No mobile gamers are creative.	Some Youtube influencers are not mobile gamers.	Some Youtube influencers are creative.	Yes / no	No	Syllogistic	Invalid
18	All chess players are strategic thinkers.	Some football players are strategic thinkers.	Some football players are chess players.	Yes / No	No	Syllogistic	Invalid
19	All students read books.	Some cricket players are students.	Some cricket players read books.	Yes / No	Yes	Syllogistic	Valid

20	No Moons are Stars	Some Planets are moons	Some planets are not stars.	Yes / No	Yes	Syllogistic	Valid
21	No students like icecream	No students like chocolate	No ice cream lovers like chocolate.	Yes / No	No	Syllogistic	Invalid
22	Some dolphins are fish	Some dolphins lay eggs.	Some fish lay eggs.	Yes / No	No	Syllogistic	Invalid
23	Some guitarists are singers.	Some drummers are singers.	Some guitarists are drummers.	Yes/No	No	Syllogistic	Invalid

Deductive Reasoning Flow Table- Adults Version (to be displayed in the interface in the same order).

Trial No.	Statement A	Statement B	Conclusion	Option	Correct option	Type	Validity
1	All painters are creative	Some architects are painters	Some architects are creative	Yes / No	Yes	Syllogistic	Valid
2	Either a premise is true or the argument fails.	The argument did not fail.	Therefore, the premise is true.	Yes / No	Yes	Disjunctive	Valid
3	If a research	The research	Therefore, it was peer-	Yes / No	No	Conditional	Invalid

	paper is reviewed, then it is credible.	paper is credible.	reviewed.				
4	Either an experiment confirms a belief or challenges it	The experiment challenged the belief	Therefore, it did not confirm the belief.	Yes / No	Yes	Disjunctive	Valid
5	If a restaurant uses fresh ingredients, then the dishes taste good.	The dishes did not taste good.	Therefore, the restaurant did not use any fresh ingredients.	Yes / No	Yes	Conditional	Valid
6	No beginner sculptors are award-winning artists.	All beginner sculptors are art interns.	Some art interns are not award-winning artists.	Yes / No	Yes	Syllogistic	Valid
7	All elected officials attend meetings.	Some government advisors attend meetings.	Some government advisors are elected officials.	Yes / no	No	Syllogistic	Invalid
8	Either the parliament postpones the law, or the committee postpones it.	The committee did not postpone the law.	Therefore, the parliament passed the bill.	Yes / No	Yes	Disjunctive	Valid
9	If the air conditioner is on, the room is cool.	If the window is open, the room is not cool.	The room is not cool, therefore the air conditioner is not on.	Yes / No	No	Conditional	Invalid

10	Either the team completes the report today, or the manager extends the deadlines.	The manager did not extend the deadline.	Therefore, the team completed the report today.	Yes / No	Yes	Disjunctive	Valid
11	If a model predicts accurately, it is useful.	If it is useful, it is adopted.	The model was adopted. Therefore,it predicts accurately.	Yes / No	No	Conditional	Invalid
12	Either the bus is delayed, or the train leaves on time.	The bus is not delayed.	Therefore, the train left on time.	Yes / No	Yes	Disjunctive	Valid
13	No unregulated AI systems are ethically credible	Some startups create unregulated AI systems.	Some startups do not create AI systems that are ethically credible.	Yes / No	Yes	Syllogistic	Valid
14	All historical documents are preserved in government records.	Some government records are confidential.	Some historical documents are confidential.	Yes / No	No	Syllogistic	Invalid
15	Some city councils approve bike lanes.	Some NGOs advocate bike lanes.	Some NGO approve bike lanes.	Yes/no	No	Syllogistic	Invalid
16	All meticulous people	Some programmers are	Some programmers avoid	Yes / no	Yes	Syllogistic	Valid

	avoid errors.	meticulous people.	errors.				
17	No spontaneous events are planned.	Some planned events produce surprising outcomes.	Some spontaneous events produce surprising outcomes.	Yes / No	No	Syllogistic	Invalid
18	All regulatory frameworks are designed for oversight .	Some oversight bodies lack transparency.	All regulatory frameworks lack transparency.	Yes / No	No	Syllogistic	Invalid
19	Some leaders are strict.	Some parents are strict.	Some leaders are parents.	Yes / No	No	Syllogistic	Invalid
20	All rivers are water bodies.	Some water bodies are polluted.	Some rivers are polluted.	Yes / No	No	Syllogistic	Invalid
21	All accountants are smart.	No poets are accountants.	No poets are smart.	Yes / No	Yes	Syllogistic	Valid
22	All researchers are authors.	Some professors are researchers.	Some professors are authors.	yes/ no	Yes	Syllogistic	Valid
23	All singers are vocalists.	Some dancers are also vocalists.	Some singers are dancers	Yes / No	No	Syllogistic	Invalid

3.After the participant completes all the blocks, we would give instructions that emphasize the end of this task.

Adolescents and Adults:

"Awesome work! You've completed this reasoning task — take a short rest before the next one."

3. Implementation Notes

Background: Black.

Text: White.

Stimulus position: centered vertically and horizontally. Use adequate line spacing.

- **Buttons:** three-dimensional rectangular, white text on dark button, border white, highlight selection -> light-blue thick border. Buttons horizontally aligned at bottom center.

4. Scoring Instructions Manual for the tech team:

Data Columns Required will not be shown to participants for interpretation, for our assessment use):

- **Round Number**: Sequential number identifying each round.
- **Problem Type:** Type or category of reasoning problem (e.g., syllogism, conditional). (applicable for adults only)
- **Problem Statement:** Text or representation of the reasoning problem.
- **Participant Response:** The chosen or written response by the participant.
- **Response Accuracy:** Assign 1 if response is logically valid/correct, otherwise 0.
- **Reaction Time (RT):** Time in milliseconds from problem presentation to participant response.

Scoring Instructions:

- Assign score 1 when the participant provides a logically correct solution.
- Assign score 0 when participant responds incorrectly or fails to respond.
- Measure RT only for rounds with participant responses.

Additional Scoring Parameters:

- **Total Rounds Answered:** Count of rounds where participant provided a response.

- **Total Rounds Not Answered**: Count of rounds with no response.
- **Correct Responses:** Number of rounds with correct answers.
- **Incorrect Responses:** Number of rounds with incorrect or no response.
- **Accuracy Rate of Overall Task :**
- Accuracy = Correct Responses/ Total Rounds Answered×100
- **Mean Reaction Time:** Average RT on all answered rounds.

2) Analogical Reasoning – Analogical Reasoning Tasks

Analogical Reasoning-Definition:

Analogical reasoning means finding how two things are related and using that same relationship to solve another pair. It's about seeing patterns in ideas, not just in words or shapes.

Analogical Reasoning Task – Definition:

In this task, participants will see a pair of words like "Sun : Day" and then another word like "Moon : ?". Their job is to pick the word that fits the same way — for example, "Night." It's like a pattern game that tests how well you find connections between ideas.

For Tech team's Reference:

1. **Task Overview**

Number of Rounds: 25 rounds (for both adolescents and adults)
Four options are given for each round to choose the correct answer.

2. Rounds Flow

1. **The participant first reads the Main Task Instructions**

Adolescents (14–18 years)

Welcome to “Number Explorer”!
Get ready to train your brain with number puzzles!

Here’s how it works:

- You’ll see a grid of numbers with one missing number marked as “?”.
- Your job is to figure out the rule or pattern and tap the number that fits.
- Some patterns will be simple, others tricky — stay sharp!

 Example:

2 4

6 ?

The correct number is 8 because the numbers increase by 2 each time.

 You’ll have 15 minutes in total for all reasoning tasks, including numbers, logic, and connections — so keep moving!

Ready to explore the numbers and find the patterns?
 Tap “Let’s Go!” to start the Number Explorer challenge!

Adults (18–22 years)

Welcome to the “Number Grid Challenge”!
This is a test of your **numerical reasoning skills** — your ability to see patterns and solve problems with numbers.

Here’s what you’ll do:

- You’ll see a **grid of numbers** with one number missing (marked as “?”).
- Figure out the **pattern or rule** that connects the numbers.

- Tap the number from the options that completes the grid correctly.

 Example:

3 6

9 ?

The correct number is **12** — the numbers increase by 3 each step.

 You'll have 15 minutes to complete all reasoning tasks, including logic and pattern tasks. Accuracy and speed both matter!

Ready to begin?
 Tap "Let's Go!" to start the Number Explorer challenge!

2. Participants then proceed to the Main Task

Main Task Round level Flow (applicable for both adolescents and adults version)

2. Stimulus display in the given format below

One analogy is displayed on the screen in the format:

A : B :: C : ?

Example: Mango : Fruit :: Carrot : ?

Response Options:

- Two or four response buttons appear below the text:
  - [Option 1]
  - [Option 2]
  - [Option 3]

- [Option 4]

- Participants select the option that correctly completes the analogy.

Response Window:

- If the participant selects an option, the system moves to the next round.

Next Round Begins

Analogical Reasoning Flow Table- Adolescents Version (to be displayed in the interface in the same order).

Round No.	Population	Stimuli (Analogy)	Options
1	Adolescents	Cat : Feline :: Dog : ?	a) Canine ✓b) Cub c) Calf d) Foal
2	Adolescents	Sun : Day :: Moon : ?	a) Light b) Night ✓c) Star d) Planet
3	Adolescents	Bird : Fly :: Fish : ?	a) Swim ✓b) Walk c) Run d) Climb

4	Adolescents	Finger : Hand :: Toe : ?	a) Foot ✓b) Leg c) Arm d) Head
5	Adolescents	Smile : Happy :: Frown : ?	a) Sad ✓b) Angry c) Excited d) Scared
6	Adolescents	Teacher : School :: Doctor : ?	a) University b) Hospital ✓c) Clinic d) Office
7	Adolescents	Leaf : Tree :: Petal : ?	a) Flower ✓b) Plant c) Branch d) Seed
8	Adolescents	Pilot : Airplane :: Captain : ?	a) Ship ✓b) Bus c) Train d) Truck
9	Adolescents	Candle : Wax :: Pencil : ?	a) Lead ✓b) Wood c) Ink d) Rubber

10	Adolescents	Teacher : School :: Judge : ?	a) Court ✓b) Police c) Lawyer d) Prison
11	Adolescents	Author : Book :: Sculptor : ?	a) Stone b) Statue ✓c) Hammer d) Art
12	Adolescents	Mirror : Reflection :: Window : ?	a) Transparency ✓b) Light c) View d) Glass
13	Adolescents	Book : Knowledge :: Food : ?	a) Hunger b) Energy ✓c) Weight d) Health
14	Adolescents	Knife : Sharp :: Cotton : ?	a) Soft ✓b) Hard c) Thick d) Thin
15	Adolescents	River : Flow :: Clock : ?	a) Ticks ✓b) Time c) Minute d) Bell

16	Adolescents	Circle : Sphere :: Rectangle : ?	a) Cone b) Cuboid ✓c) Cube d) Cylinder
17	Adolescents	Camera : Lens :: Eye : ?	a) Face b) Light c) Bright d) Vision ✓
18	Adolescents	Hope : Despair :: Light : ?	a) Day b) Bright c) Dark ✓d) Shine
19	Adolescents	Key : Lock :: Password : ?	a) Door b) Type c) Access ✓d) Note
20	Adolescents	Plant : Photosynthesis :: Human : ?	a) Eating b) Sleeping c) Learning d) Breathing ✓
21	Adolescents	Courage : Fear :: Generosity : ?	a) Kindness b) Greed ✓c) Love d) Care

22	Adolescents	Question : Answer :: Cause : ?	a) Doubt b) Response c) Effect ✓d) Solution
23	Adolescents	Telescope : Star :: Microscope : ?	a) Microbe ✓b) Planet c) Atom d) Light
24	Adolescents	Compass : Direction :: Thermometer : ?	a) Mercury b) Temperature ✓ c) Pressure d) Weather
25	Adolescents	Democracy : People :: Monarchy : ?	a) King ✓b) Law c) Government d) Crown

Analogical Reasoning Flow Table- Adults Version (to be displayed in the interface in the same order).

Round No.	Population	Stimuli (Analogy)	Options

1	Adults	Teacher : School :: Doctor : ?	a) Hospital ✓b) Gym c) Home d) Office
2	Adults	Book : Knowledge :: Gym : ?	a) Exercise ✓b) Rest c) Food d) Sleep
3	Adults	Pen : Paper :: Brush : ?	a) Canvas ✓b) Wall c) Screen d) Wood
4	Adults	Fire : Heat :: Ice : ?	a) Cold ✓b) Freeze c) Water d) Snow
5	Adults	Mirror : Reflection :: Clock : ?	a) Time ✓b) Alarm c) Watch d) Hands

No.	**Population**	**Stimuli (Analogy)**	**Options**
6	Adults	Architect : Blueprint :: Chef : ?	a) Kitchen b) Recipe ✓c) Restaurant d) Meal
7	Adults	Key : Lock :: Password : ?	a) Code b) Enter c) Access ✓d) Door

8	Adults	Shepherd : Sheep :: Gardener : ?	a) Garden ✓b) Plants c) Farm d) Trees
9	Adults	Leader : Guidance :: Map : ?	a) Travel b) Directions ✓c) Compass d) Plan
10	Adults	Pen : Writer :: Brush : ?	a) Painter ✓b) Sculptor c) Artist d) Paper
11	Adults	Justice : Law :: Health : ?	a) Medicine ✓b) Care c) Hospital d) Nutrition
12	Adults	Doctor : Prescription :: Judge : ?	a) Judgment ✓b) Court c) Law d) Trial
13	Adults	Creativity : Art :: Innovation : ?	a) Science b) Business c) Technology ✓ d) Design
14	Adults	Court : Law :: Factory : ?	a) Product ✓b) Worker c) Industry d) Manager
15	Adults	Wide : Narrow :: Deep : ?	a) Wide b) Shallow ✓c) Large d) Pit

No.	Population	Stimuli (Analogy)	Options
16	Adults	Argument : Debate :: Question : ?	a) Inquiry ✓b) Answer c) Statement d) Proposal
17	Adults	Jury : Verdict :: Voter : ?	a) Election ✓b) Party c) Candidate d) Law
18	Adults	Oxygen : Respiration :: Fuel : ?	a) Engine b) Gas c) Combustion ✓d) Air
19	Adults	Word : Sentence :: Note : ?	a) Music ✓b) Sound c) Letter d) Tune
20	Adults	Hypothesis : Theory :: Observation : ?	a) Experiment b) Data ✓c) Conclusion d) Method
21	Adults	Currency : Value :: Language : ?	a) Communication ✓b) Culture c) People d) Nation
22	Adults	Latitude : Longitude :: Altitude : ?	a) Depth ✓b) Elevation c) Width d) Height

23	Adults	Law : Order :: Education : ?	a) Knowledge ✓b) School c) Wisdom d) Rules
24	Adults	Spectrum : Light :: Scale : ?	a) Measurement ✓b) Color c) Frequency d) Weight
25	Adults	DNA : Genetics :: Algorithm : ?	a) Machine b) Code ✓c) Computer d) Program

3.After the participant completes all the blocks, we would give instructions that emphasize the end of this task.

Adolescents and Adults:

> "Awesome work! You've completed this reasoning task — take a short rest before the next one."

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- **Accuracy Rate of Overall Task:**
- Accuracy=Correct Responses/ Total Rounds Answered×100
- **Mean Reaction Time:** Average RT on all answered rounds.

3) Numerical Reasoning - Numerical Reasoning Task

Numerical Reasoning-Definition:

Numerical reasoning means spotting patterns in numbers and figuring out which number comes next.

Numerical Reasoning Task – Definition:

In this task, participants will see number grids with one number missing. Their job is to find the missing number by spotting the pattern with the options that they will be given below.

For Tech team's Reference:

1. **Task Overview**

Number of Rounds: 25 rounds (for both adolescents and adults)
Four options are given for each round to choose the correct answer.

2. Rounds Flow

1.The participant first reads the Main Task Instructions

Adolescents (14–18 years)

"Now it's time for a game of *connections*!
You'll see pairs of words that are related in some way.
Your job is to find the same kind of link between another pair."

Example: Rain : Umbrella :: Sun : ?

→ a) Cloud b) Hat ✓**c) Sunglasses** d) Sky

(When it rains, you use an umbrella; when it's sunny, you use sunglasses.)
"See? Each pair follows a pattern — your task is to find the one that fits best.
Be quick and careful — ready to test your mind?

Tap *Let's Go!* to begin!"

Adults (18–22 years)

"In this task, you'll see pairs of words connected by meaning or function.
Your job is to find another pair that follows the same kind of connection."

Example: Lock : Security :: Seatbelt : ?

→ a) Travel b) Car ✓**c) Safety** d) Drive

(A lock provides security, and a seatbelt provides safety.)

“You’ll see one pair with a missing word and a few choices.
Choose the word that best completes the pattern.
Stay sharp — this round is all about quick thinking and meaningful connections!”

Tap *Let’s Go!* to begin!”

2. Participants then proceed to the Main Task

Main Task Round level Flow (applicable for both adolescents and adults version)

1. **Fixation Cross:**
    - A “+” appears at the center of the screen for 0.3 s before each trial.
2. **Stimulus Presentation:**
    - A 2×2 or 3×3 or 4x4 grid of numbers is displayed, with one missing number marked as “?”.

Example (2×2 grid):

```
+----+----+
| 2 | 4 |
+----+----+
| 6 | ? |
+----+----+
```

3. **Response Options:**
    - Below the grid, four possible answer choices are shown.
    - Example: [5] [6] [8] [10]
4. **Response Window:**
    - If the participant answers , the system moves to the next round.

5. Next Round Begins.
6. And continue from Step 1 to 5 repeatedly.

Numerical Reasoning Flow Table- Adolescents Version (to be displayed in the interface in the same order).

Round No.	Stimuli	Row×Column	Options	Correct Answer
1	7 39 20 ?	2×2	A) 120 B) 72 C) 110 D) 117	D
2	12 6 9 ?	2×2	A) 8 B) 9 C) 10 D) 11	B
3	8 4 3 ?	2×2	A) 3 B) 4 C) 5 D) 6	B
4	9 5 14 ?	2×2	A) 11 B) 7 C) 10 D) 3	C
5	4 19 6 ?	2×2	A) 32 B) 35 C) 40 D) 39	D
6	3 8 8 ?	2×2	A) 1 B) 3 C) 5 D) 4	B

7	1 4 7 4 7 10 10 13 ?	3×3	A) 17 B) 15 C) 16 D) 18	C
8	7 10 8 3 4 ? 16 26 44	3×3	A) 2 B) 3 C) 7 D) 6	D
9	1 2 9 3 1 16 4 1 ?	3×3	A) 17 B) 20 C) 30 D) 25	D
10	3 ? 9 4 6 1 10 16 19	3×3	A) 3 B) 8 C) 7 D) 5	D
11	2 5 9 9 8 4 11 13 ?	3×3	A) 13 B) 14 C) 17 D) 15	A
12	7 6 5 3 ? 1 14 13 16	3×3	A) 5 B) 6 C) 8 D) 9	D

13	7 4 8 3 6 3 5 4 1 2 2 ? 6 1 5 2	4×4	A) 5 B) 7 C) 1 D) 3	C
14	1 3 5 8 2 5 8 12 3 7 11 ? 11 30 49 68	4×4	A) 8 B) 9 C) 10 D) 11	A
15	1 2 3 4 2 4 2 1 3 5 2 2 6 13 ? 6	4×4	A) 9 B) 7 C) 8 D) 11	C
16	7 3 6 9 3 4 2 9 ? 5 4 6 4 2 4 12	4×4	A) 5 B) 6 C) 8 D) 10	B
17	1 5 9 15 3 7 11 17 5 9 ? 19 7 11 15 21	4×4	A) 11 B) 12 C) 13 D) 14	C

18	2 5 6 4 1 3 2 1 4 7 ? 6 2 7 12 2	4×4	A) 21 B) 23 C) 22 D) 26	C

Numerical Reasoning Flow Table- Adults Version (to be displayed in the interface in the same order).

Round No.	Stimuli	Row×Column	Options	Correct Answer
1	2 19 6 ?	2×2	A) 21 B) 22 C) 23 D) 24	C
2	4 7 10 ?	2×2	A) 14 B) 18 C) 3 D) 5	C
3	5 8 3 ?	2×2	A) 31 B) 32 C) 34 D) 37	D
4	6 2 ? 8	2×2	A) 5 B) 6 C) 7 D) 8	C
5	35 68 43 ?	2×2	A) 52 B) 53 C) 55 D) 56	B

6	55 12 58 ?	2×2	A) 16 B) 17 C) 18 D) 19	A
7	5 11 17 4 10 16 9 21 ?	3×3	A) 40 B) 37 C) 33 D) 35	C
8	12 ? 5 24 24 4 30 9 3	3×3	A) 13 B) 14 C) 17 D) 15	D
9	7 9 ? 5 5 8 23 55 63	3×3	A) 13 B) 10 C) 7 D) 15	B
10	5 6 7 10 15 25 25 40 ?	3×3	A) 33 B) 34 C) 35 D) 36	C
11	8 2 63 7 4 ? 5 7 69	3×3	A) 59 B) 60 C) 61 D) 63	B
12	1 2 5 2 ? 9 4 6 14	3×3	A) 59 B) 60 C) 61 D) 63	B

13	4 7 11 14 7 12 17 22 9 17 ? 32 13 24 37 48	4×4	A) 23 B) 25 C) 24 D) 22	B
14	1 2 3 4 2 6 8 12 ? 4 6 7 4 3 2 1	4×4	A) 1 B) 3 C) 4 D) 2	D
15	4 1 3 11 3 2 4 3 ? 1 9 18 8 2 7 38	4×4	A) 3 B) 5 C) 6 D) 7	B
16	42 11 ? 34 34 12 62 40 32 10 57 35 28 17 61 50	4×4	A) 62 B) 63 C) 65 D) 64	C
17	12 35 43 38 3 11 11 15 64 55 48 ? 11 13 16 13	4×4	A) 32 B) 33 C) 34 D) 35	D

18	3 5 9 8 11 6 7 14 13 9 4 25 38 1 2 ?	4×4	A) 7 B) 13 C) 11 D) 10	B

3.After the participant completes all the blocks, we would give instructions that emphasize the end of this task.

Adolescents and Adults:

"Awesome work! You've completed the whole reasoning task- now get ready for a different task".

3. Implementation Notes

Background: Black.

Text: White.

Stimulus position: centered vertically and horizontally. Use adequate line spacing.

- **Buttons:** three-dimensional rectangular, white text on dark button, border white, highlight selection -> light-blue thick border. Buttons horizontally aligned at bottom center.

4. Scoring Instructions Manual for the tech team:

Data Columns Required will not be shown to participants for interpretation, for our assessment use):

- **Round Number**: Sequential number identifying each round.
- **Problem Type:** Type or category of reasoning problem (e.g., syllogism, conditional). (applicable for adults only)
- **Problem Statement:** Text or representation of the reasoning problem.
- **Participant Response:** The chosen or written response by the participant.

- **Response Accuracy:** Assign 1 if response is logically valid/correct, otherwise 0.
- **Reaction Time (RT):** Time in milliseconds from problem presentation to participant response.

Scoring Instructions:

- Assign score 1 when the participant provides a logically correct solution.
- Assign score 0 when participant responds incorrectly or fails to respond.
- Measure RT only for rounds with participant responses.

Additional Scoring Parameters:

- **Total Rounds Answered:** Count of rounds where participant provided a response.
- **Total Rounds Not Answere**d: Count of rounds with no response.
- **Correct Responses:** Number of rounds with correct answers.
- **Incorrect Responses:** Number of rounds with incorrect or no response.
- **Accuracy Rate of Overall Task:**
- Accuracy=Correct Responses/ Total Rounds Answered×100
- **Mean Reaction Time:** Average RT on all answered rounds.