



# FrailSafe Games: design and capabilities

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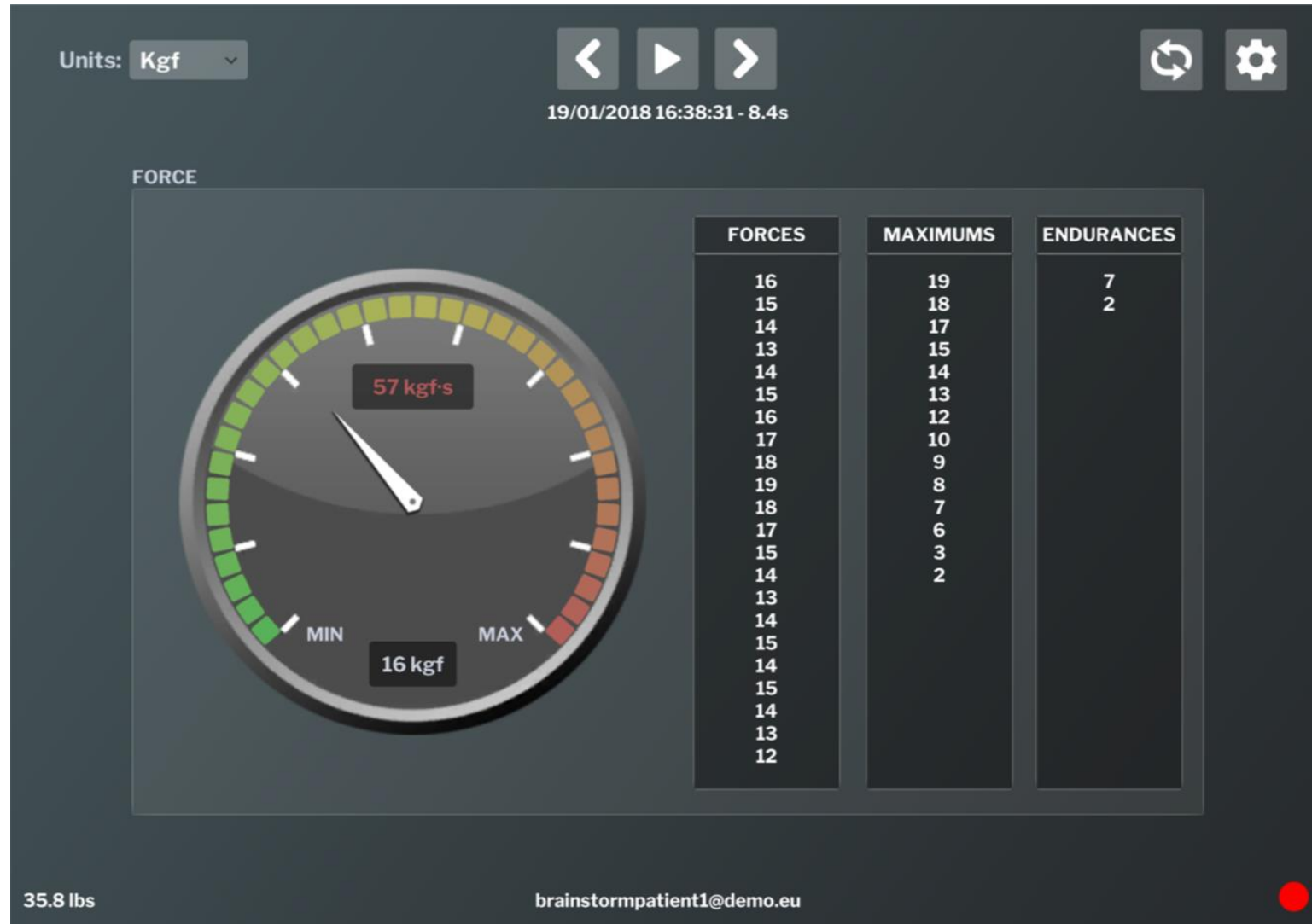
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[www.frailsafe-project.eu](http://www.frailsafe-project.eu)

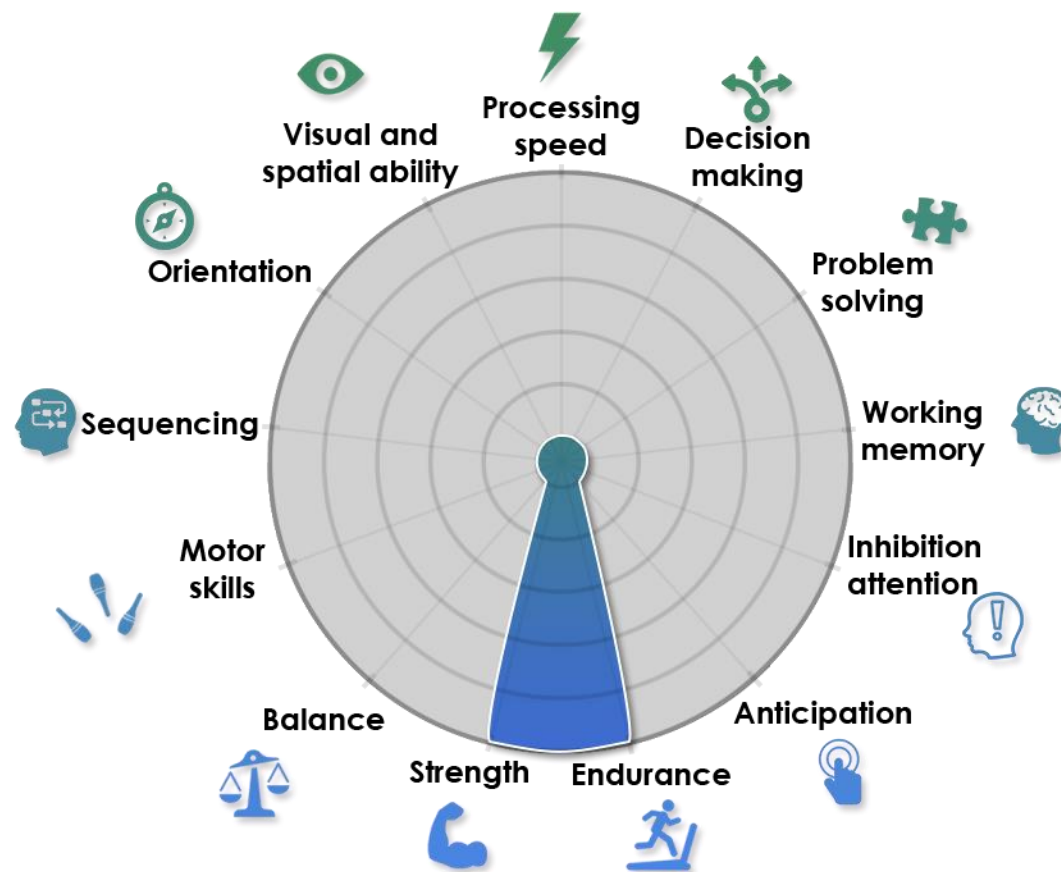
# Abilities in FrailSafe games

| ABILITIES |   | DEFINITION  |
|-----------|---|---|
| COGNITIVE | <b>Short Term Memory (Working Memory)</b> | The capacity to hold and manipulate information “on-line” in real time.   |
|           | <b>Visual and Spatial Ability</b>         | Ability to process incoming visual stimuli, to understand spatial relationship between objects, and to visualize images and scenarios   |
|           | <b>Processing speed</b>                   | The ability to minimize the time cycle of a repeated movement.  |
|           | <b>Motor Skills</b>                       | Ability to mobilize our muscles and bodies, and ability to manipulate objects.  |
|           | <b>Inhibition / Attention</b>             | The ability to withstand distraction, and internal urges / Ability to sustain concentration on a particular object, action, or thought, and ability to manage competing demands in our environment. |
|           | <b>Orientation</b>                        | Processing of spatial, temporal, and social relations relies on mental cognitive maps, on which the behaving self is oriented relative to different places, events, and people.                     |
|           | <b>Anticipation</b>                       | Prediction based on pattern recognition.  |
|           | <b>Problem solving</b>                    | Defining the problem in the right way to then generate solutions and pick the right one.  |
|           | <b>Decision Making</b>                    | The ability to make decisions based on problem-solving, on incomplete information and on emotions (ours and others’).   |
|           | <b>Sequencing</b>                         | The ability to break down complex actions into manageable units and prioritize them in the right order.   |
| PHYSICAL  | <b>Strength</b>                           | The ability of a muscular unit, or combination of muscular units, to apply force.   |
|           | <b>Endurance (Muscular fatigue)</b>       | A state of exhaustion or loss of strength and/or muscle endurance following strenuous activity associated with the accumulation of lactic acid in muscles.  |
|           | <b>Balance</b>                            | The ability to control the placement of the bodies center of gravity in relation to its support base.   |

# Force Analyzer



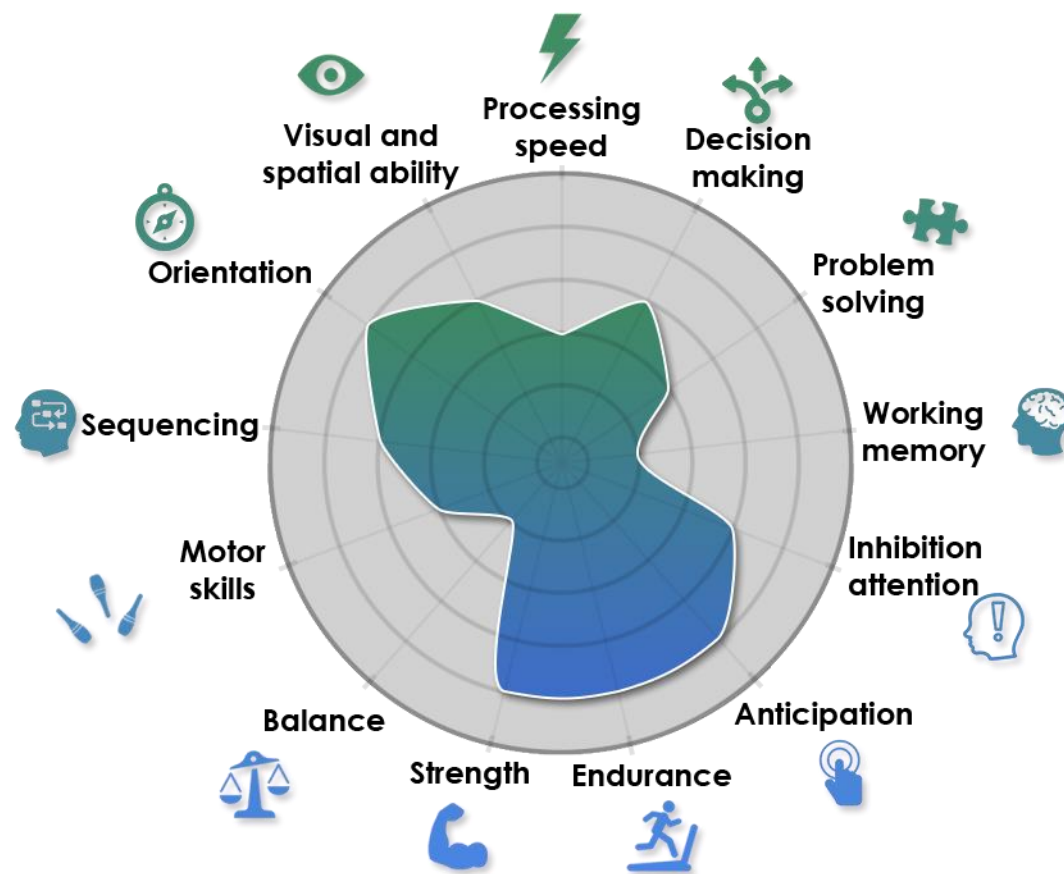
# Force Analyzer




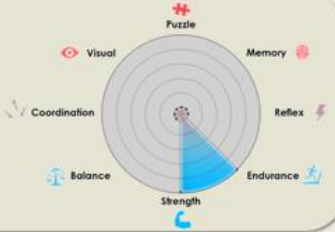

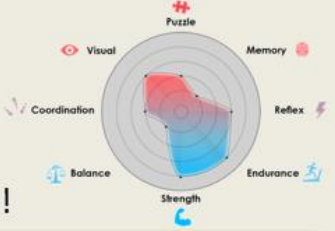

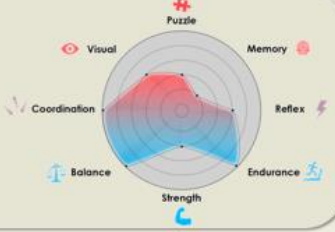




# RedWings

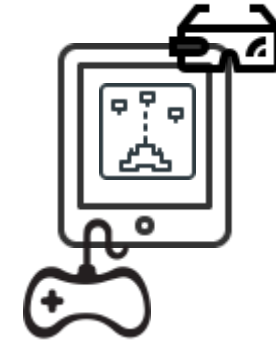


# RedWings



# Serious Games

|   |  |   |
|---|--|---|
|    | <b>Force Analyzer</b><br>More than a game, this tool allows us to detect the force applied on a wireless hand gripper in order to analyze user's strength and endurance.                           |    |
|    | <b>RedWings</b><br>By applying a dynamic force on the hand gripper, the player pilots a plane across a landscape replete of dangers and obstacles. Force, reflexes and endurance will be required! |    |
|    | <b>Railway</b><br>Here, the player controls an explorer running away from an abandoned mine. By means of a sensorised vest, player's arms and body movements are translated into the game.         |    |
|   | <b>Simon</b><br>As in the physical toy, this game proposes sound and color sequences that players need to memorize and reproduce. The length and number of trees increase as you play!             |   |
|  | <b>Memory</b><br>Sets of stones with hidden symbols are placed on the ground to be found and matched by the player. The number of stones and symbols increase as you play!                         |  |



mobile and augmented  
reality games

frail  safe

# Serious Games



## Reflex

All about reflexes, this game shows a pine tree where pine cones suddenly appear and the player needs to pick them before falling on the ground. They'll fall faster as you play!



## Virtual Supermarket

More than a game, a simulator where most of the activities within a supermarket can be trained. Walking on the aisles, finding items, paying, etc..



## Gravity Ball

A marker-based AR game where the user manipulates the marker orientation to guide the virtual balls to the exit hole using real-world gravity and dynamics.



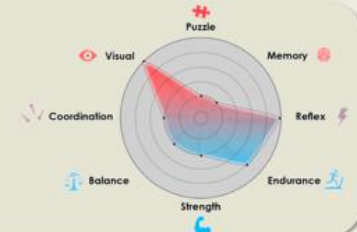
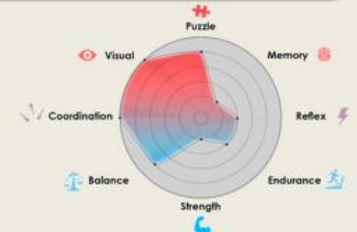
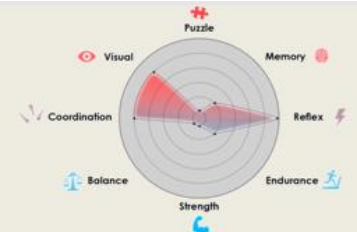
## Floating archery

Seeing through AR Glasses, the user uses a hand grip to aim and had a time window to launch arrows in a virtual archery target based on his grip force.



## Memory AR

Surrounded by virtual objects, the user searches for them through glasses, always keeping in mind their discovery order as he will be tested on his short-term memory.

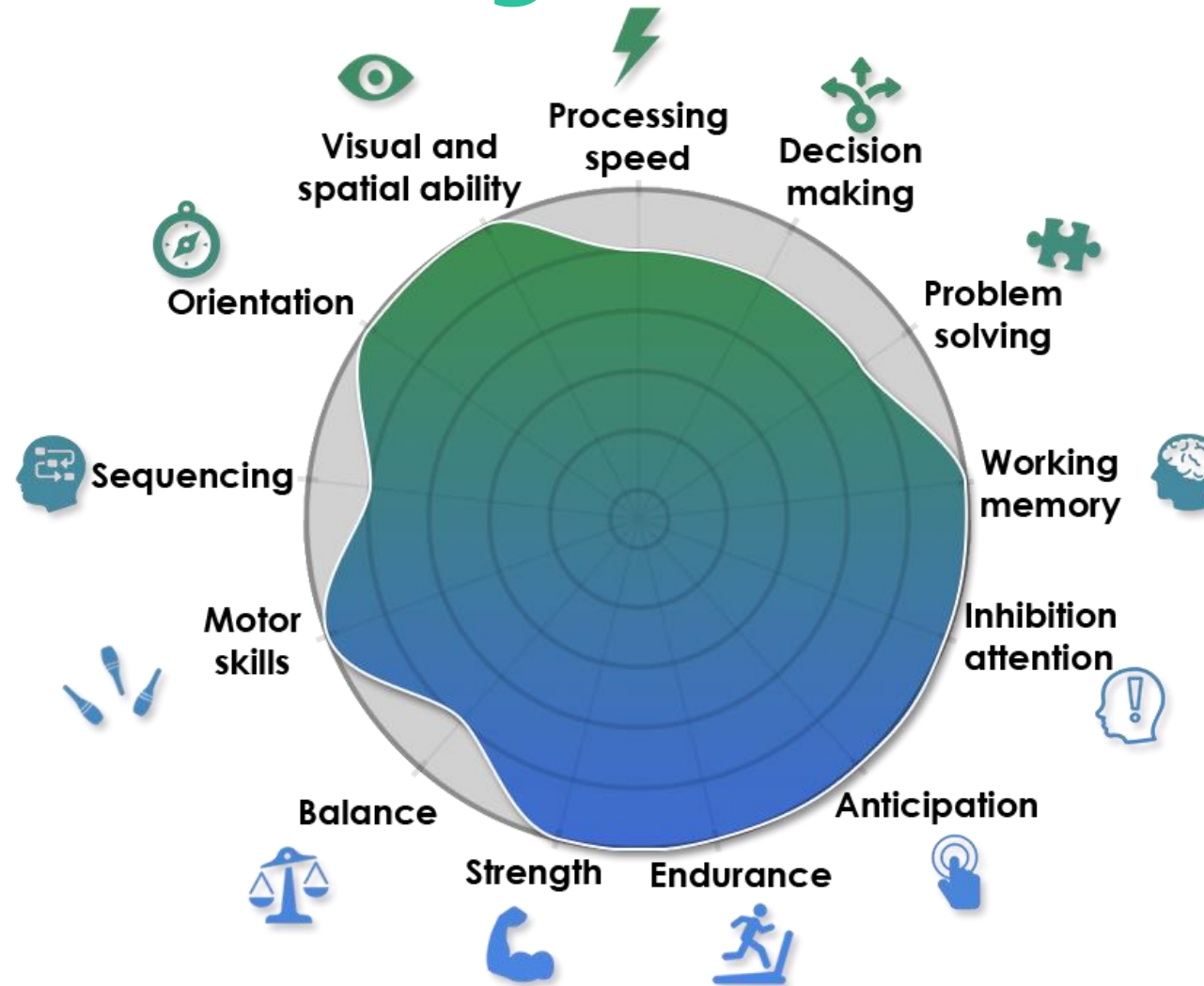


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# All Frailsafe games



# Games / Abilities

| SET OF GAMES            | COGNITIVE ABILITIES |                            |                  |              |                        |             |              |                 |                 |            | PHYSICAL ABILITIES |                              |         |
|-------------------------|---------------------|----------------------------|------------------|--------------|------------------------|-------------|--------------|-----------------|-----------------|------------|--------------------|------------------------------|---------|
|                         | Working Memory      | Visual and Spatial Ability | Processing speed | Motor Skills | Inhibition / Attention | Orientation | Anticipation | Problem-solving | Decision Making | Sequencing | Strength           | Endurance (Muscular fatigue) | Balance |
| FORCE ANALYZER          |                     |                            |                  |              |                        |             |              |                 |                 |            | ✓                  | ✓                            |         |
| RED WINGS               |                     |                            |                  |              |                        |             | ✓            | ✓               | ✓               |            | ✓                  | ✓                            |         |
| RAIL WAY                |                     |                            |                  | ✓            |                        |             | ✓            |                 |                 |            |                    |                              | ✓       |
| SIMON                   | ✓                   | ✓                          | ✓                |              | ✓                      |             |              |                 |                 | ✓          |                    |                              |         |
| MEMORY                  | ✓                   |                            | ✓                |              | ✓                      |             |              |                 |                 |            |                    |                              |         |
| REFLEX                  |                     | ✓                          |                  | ✓            |                        |             | ✓            |                 | ✓               | ✓          |                    |                              |         |
| VIRTUAL SUPERMARKET     |                     |                            |                  |              |                        | ✓           |              | ✓               | ✓               |            |                    |                              |         |
| GRAVITY BALL            |                     | ✓                          |                  | ✓            |                        |             |              | ✓               | ✓               |            |                    |                              |         |
| FLOATING ARCHERY TARGET |                     | ✓                          |                  | ✓            |                        |             | ✓            |                 | ✓               | ✓          |                    |                              |         |

# Game Sessions Logs

|        | Flappy | F. Analyzer | Memory | Railway | RedWings | Reflex | Simon |
|--------|--------|-------------|--------|---------|----------|--------|-------|
| France | 3295   | 145         | 1968   | 503     | 2731     | 1703   | 1464  |
| Cyprus | 2426   | 198         | 583    | 240     | 3185     | 699    | 660   |
| Greece | 493    | 233         | 1821   | 290     | 2124     | 1406   | 1135  |

# Dynamic adaptability

|          |                           | Force Analyzer |              | Red Wings      |                 |             | Simon        |               | Memory       |              |                   | RailWay         |              | Reflex          |             | VPM  |      |                 |               |             |           |              |               |                |         |
|----------|---------------------------|----------------|--------------|----------------|-----------------|-------------|--------------|---------------|--------------|--------------|-------------------|-----------------|--------------|-----------------|-------------|------|------|-----------------|---------------|-------------|-----------|--------------|---------------|----------------|---------|
|          |                           | FA_MaxForce    | FA_Endurance | RW_MaxDistance | RW_MeanDistance | RW_MaxForce | SM_MaxLength | SM_MeanLength | MM_LastLevel | MM_LastPairs | MM_MeanHitPercent | RR_MeanDistance | RR_MeanScore | RF_MeanReaction | RF_HitCount | MMSE | MOCA | Memory complain | Grip strength | BMI / Force | GDS Score | Polypharmacy | Visual acuity | Blood pressure | Frailty |
| RedWings | Maximum required force    | X              | X            |                |                 | X           |              |               |              |              |                   |                 |              |                 |             |      |      |                 | X             | X           |           |              |               |                | X       |
|          | Plane speed               |                |              |                |                 |             |              |               |              |              |                   |                 |              | X               |             | X    | X    | X               |               | X           | X         | X            | X             | X              | X       |
|          | Number of obstacles       |                |              | X              | X               |             |              |               |              |              |                   |                 |              | X               |             | X    | X    | X               |               | X           | X         | X            | x             | X              | X       |
|          | Starting point            |                |              | X              | X               |             |              |               |              |              |                   |                 |              |                 |             | X    | X    | X               |               |             | X         | X            | X             | X              | X       |
| Simon    | Sequence speed            |                |              |                |                 |             |              |               |              |              |                   |                 |              | X               |             |      |      |                 |               |             |           |              |               |                |         |
|          | Starting level            |                |              |                |                 |             | X            | X             |              | X            |                   |                 |              |                 |             |      |      |                 |               |             |           |              |               |                |         |
|          | Number of trees           |                |              |                |                 |             | X            |               |              |              |                   |                 |              |                 |             |      |      |                 |               |             |           |              |               |                |         |
| Memo     | Starting stones number    |                |              |                |                 |             | X            |               | X            | X            |                   |                 |              |                 |             |      |      |                 |               |             |           |              |               |                |         |
|          | Maximum allowed moves     |                |              |                |                 |             |              |               | X            | X            |                   |                 |              |                 |             |      |      |                 |               |             |           |              |               |                |         |
| RailWay  | Wagon speed               |                |              |                |                 |             |              |               |              |              | X                 | X               | X            |                 |             |      |      |                 |               |             |           |              |               |                |         |
|          | Number of obstacles       |                |              |                |                 |             |              |               |              |              | X                 | X               | X            |                 |             |      |      |                 |               |             |           |              |               |                |         |
|          | Number of coins           |                |              |                |                 |             |              |               |              |              | X                 | X               | X            |                 |             |      |      |                 |               |             |           |              |               |                |         |
| Reflex   | Pineapple disappear delay |                |              |                |                 |             |              |               |              |              |                   |                 |              | X               | X           | X    | X    | X               |               |             | X         | X            | X             | X              | X       |
|          | Next pineapple time delta |                |              |                |                 |             |              |               |              |              |                   |                 |              | X               | X           | X    | X    | X               |               |             | X         | X            | X             | X              | X       |