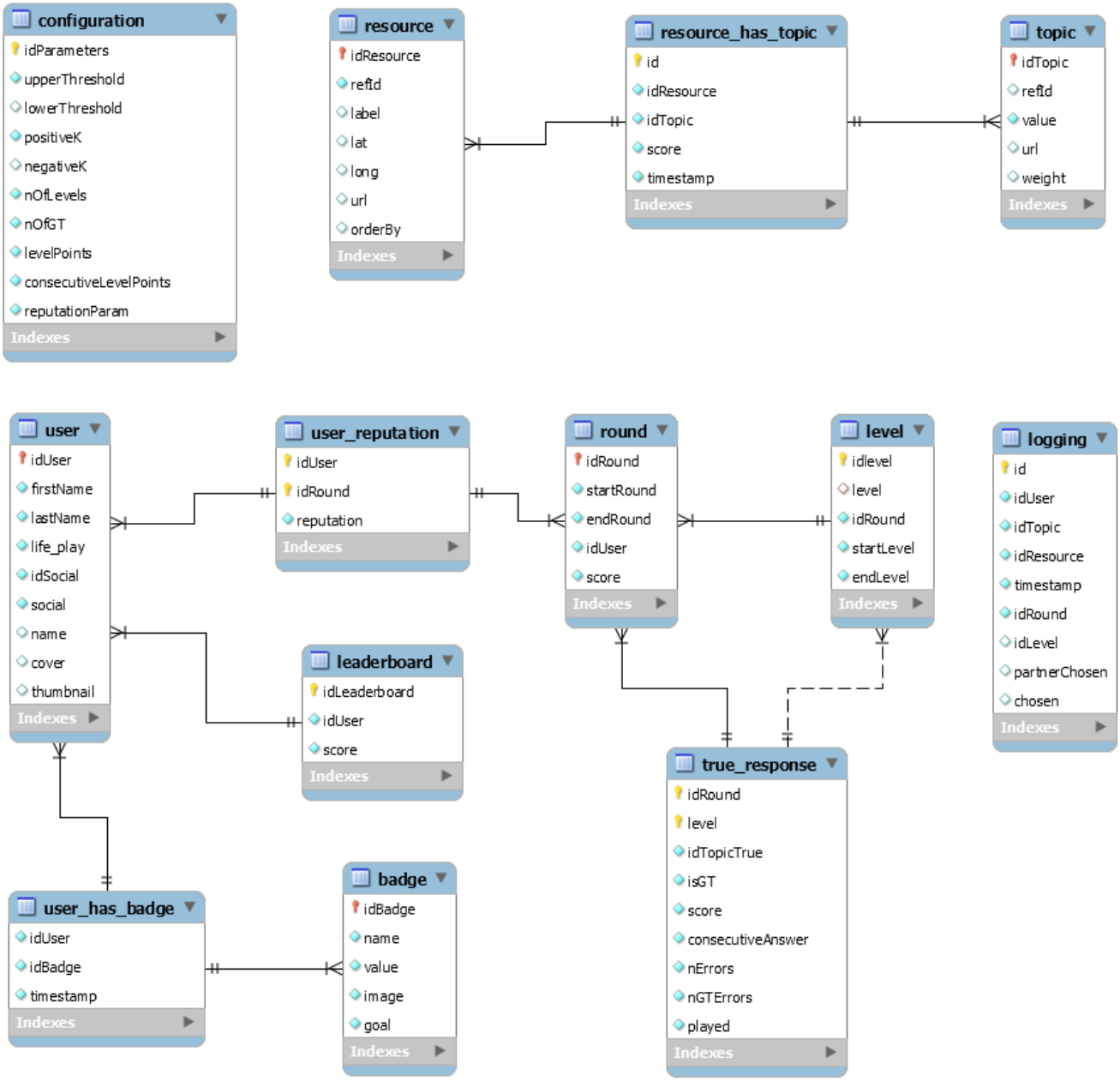
GWAP ENABLER DB DESCRIPTION

This document describes the database structure of the GWAP enabler (https://github.com/STARS4ALL/gwap-enabler/wiki/DB-structure).

The `gwap-enabler-db` database is a relational MySQL database and its data model is graphically shown in the following picture.



The database is made of 13 tables, which belong to three main groups:

1. **Game data**: `resource`, `resource_has_topic` and `topic`; those tables contain the data linking problem information; they are filled according to the purpose of the specific GWAP built on top of the enabler.
2. **Game customization**: `configuration` and `badge`; those tables can be customized in relation to the desired game behaviour (*configuration* to change the GWAP parameters and *badge* to change the badges given to the players in the game).
3. **Game internals**: `user`, `user_has_badge`, `user_reputation`, `leaderboard`, `round`, `level`, `logging` and `true_response`; the other tables are automatically filled during the gameplay and do not need to be modified; you are of course free to adapt anything at your will, but be aware that altering those tables will require also modifying the code.

In the following, we explain the details of each of the database tables. The meaning of the columns is as follows:

- *Name*: name of the table field
- *Type*: type of the table field
- *Nullable*: indicates whether the field can contain NULL values
- *PK*: indicates whether the field is a primary key of the table
- *AI*: indicates that the field is auto-incremented (this usually happens with row id)
- *Description*: textual description of the field meaning

1. Game data tables

The following tables are those to be filled with the data linking problem information.

resource

This table contains the resources, i.e. the subjects of the links, with the information necessary for the game. Depending on the information needed, fields can be added or removed.

Name	Type	Nullable	PK	AI	Description
idResource	int	NO	YES	YES	Resource ID
refId	varchar	NO			Resource reference ID, i.e. the resource ID in an external system; for example, the URI of the resource
label	varchar	YES			Resource label (if any)
url	varchar	YES			URL of a media representation (e.g. an image) of the resource (if any)
lat	double	YES			Resource latitude (if any)
long	double	YES			Resource longitude (if any)
orderBy	double	YES			The order by which the resources are picked by the game. It can be a random number to shuffle the set of resources

topic

This table contains the topics, i.e. the objects of the links, with the information necessary for the game. Depending on the information needed, fields can be added or removed.

Name	Type	Nullable	PK	AI	Description
idTopic	int	NO	YES	YES	Topic ID
refId	varchar	YES			Topic reference ID, i.e. the topic ID in an external system; for example, the URI of the topic, if the topic is a resource
value	varchar	NO			Topic value; if the topic is a resource (i.e. refId is the URI), the value is the topic label to be displayed; if the topic is a literal, the value is the literal itself
url	varchar	YES			URL of a media representation (e.g. an image) of the topic (if any)
weight	float	YES			Weight of the topic, used to generate a random link to simulate the response of the partner player, if no previous responses exist. It can be simply initialized as 1/(number of different topics)

resource_has_topic

This table contains the relations between resources and topics, i.e. the links between subjects and objects. Each link has a score, a number between 0 and 1. If the score is above the upper threshold, it is considered true, if it is below the lower threshold it is considered false.

Name	Type	Nullable	PK	AI	Description
id	int	NO	YES	YES	Relation ID
idResource	int	NO			Resource ID (from resource table)
idTopic	int	NO			Topic ID (from topic table)
score	float	NO			Score of the relation. Score range is [0,1]
timestamp	timestamp	NO			Timestamp of the record

2. Game customization tables

The following two tables contain the basic customizable information for the game.

configuration

This table contains the GWAP configuration parameters.

Name	Type	Nullable	PK	AI	Description
idParameters	int	NO	YES	YES	Configuration ID
upperThreshold	float	NO			Upper threshold for a link score to consider the link true
lowerThreshold	float	YES			Lower threshold for a link score to consider the link false
positiveK	float	NO			Positive link score increment when the link is chosen among the others
negativeK	float	YES			Negative link score decrement when the link is not chosen among the others
nOfLevels	int	NO			N° of levels (turns) that constitute a game round
nOfGT	int	NO			N° of levels (turns) of Ground Truth in a game round. Of course, nOfGT<nOflevels must hold
levelPoints	int	NO			The points gained by a player when he agrees with the other player
consecutiveLevelPoints	int	NO			The points gained by a player for each consecutive agrement
reputationParam	int	NO			The exponent of the player reputation formula: r = exp(-reputationParam*nGTErrors). Reputation is used to weight the link score increment or decrement

badge

This table contains the badges available in the game.

Name	Type	Nullable	PK	AI	Description
idBadge	int	NO	YES	YES	Badge ID
name	varchar	NO			Badge name
value	varchar	NO			Badge description
image	varchar	NO			Badge image path
goal	int	NO			Badge logical identifier. It's used by the application to identify a badge beside its ID

3. Game internal tables

The following tables are dynamically filled and used during the gameplay. They should not be modified (unless you really know what you are doing!).

user

This is the users table. The SN letters in the fields' description indicates that that information is obtained from the social network used for authentication.

Name	Type	Nullable	PK	AI	Description
idUser	int	NO	YES	YES	User ID
firstName	varchar	NO			User first name – SN. For guest users the 'GUEST' value is used
lastName	varchar	NO			User last name - SN
life_play	int	NO			Total time played in seconds
idSocial	varchar	NO			User social network ID - SN. For guest users the IP value of the browser is used
social	varchar	NO			Social network ID. For guest users the 'anonymous' value is used
name	varchar	YES			User name -SN
cover	varchar	YES			User cover picture url - SN
thumbnail	varchar	YES			User thumbnail picture url - SN

user_reputation

This table contains the players reputation calculated for each round. Reputation `r` is calculated on the answers given by a user for the levels of Ground Truth with the following formula:

```
r = e^(-reputationParam*nGTErrors)
```

Where `reputationParam` is a scale factor whose value is stored in the configuration table, and `nGTErrors` is the number of wrong answer given by the player for the levels of Ground Truth. The reputation value is used to weight the score variations `Δs` of the links selected by the user according to the following formula:

```
Δs = +r*positiveK
```

or

```
Δs = -r*negative
```

Name	Type	Nullable	PK	AI	Description
idUser	int	NO	YES		User ID (from user table)
idRound	int	NO	YES		Round ID (from round table)
reputation	float	NO			User reputation for given round

user_has_badge

This table contains the relations between users and badges, i.e. the badges gained by each player.

Name	Type	Nullable	PK	AI	Description
idUser	int	NO	YES		User ID
idBadge	int	NO	YES		Badge ID
timestamp	timestamp	NO			Timestamp of the record

leaderboard

This table contains the total points collected by each player.

Name	Type	Nullable	PK	AI	Description
idLeaderboard	int	NO	YES	YES	Leaderboard ID
idUser	int	NO			User ID (from user table)
score	int	NO			Total points gained by the player

round

This table contains the rounds information. Each rounds represent a game played by a user.

Name	Type	Nullable	PK	AI	Description
idRound	int	NO	YES	YES	Round ID
startRound	timestamp	NO			Game start date and time
endRound	timestamp	NO			Game end date and time
idUser	int	NO			User ID (from user table)
score	int	NO			Points collected by the user

level

This table contains the information of the levels (turn) of a game round.

Name	Type	Nullable	PK	AI	Description
idlevel	int	NO	YES	YES	Level ID
level	varchar	YES			Level description (e.g., “level 1”, “level 2”, etc.)
idRound	int	NO			Round ID (from round table)
startLevel	timestamp	NO			Date and time of the level beginning
endLevel	timestamp	NO			Data and time of the level end

logging

This table contains the game logs at the granularity of a played level, where a record for each link in the level is inserted.

Name	Type	Nullable	PK	AI	Description
id	int	NO	YES	YES	Log ID
idUser	int	NO			User ID (from user table)
idResource	int	NO			Resource ID (from resource table)
idTopic	int	NO			Topic ID (from topic table)
timestamp	timestamp	NO			Date and time of the log registration
idRound	int	NO			Round ID (from round table)
idLevel	int	YES			Level ID (from level table)
chosen	bit	YES			If the link is the one chosen by the user
partnerChosen	bit	YES			If the link is the one selected by the other player (or the ground truth value)

true_response

This is a support table containing information on the levels, i.e. the turns that constitute a round.

Name	Type	Nullable	PK	AI	Description
idRound	int	NO	YES		Round ID (from round table)
level	int	NO	YES		Level number inside the round
idTopicTrue	int	NO			Agreement topic ID, it can be the recorded choice of another player in the past or randomly picked one
isGT	bit	NO			If the link is of Ground Truth, i.e. its score is above the upper threshold
score	int	NO			The total points of the player at the end of the level
consecutiveAnswer	int	NO			The number of agreement consecutive answers (-1) at the end of the level
nErrors	int	NO			The number of errors at the end of the level. Error is considered when the player doesn't choose the agreement topic
nGTErrors	int	NO			The number of Ground Truth errors, i.e. the errors on Ground Truth links
played	bit	NO			If the level has been played or the player left the game before the end of the round. The round ends when all of its levels are played or if the available time finishes