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Project proposal

## Game-based learning and interactive environments to learn SQL spatial queries

There is currently a movement with the idea that coding is the new literacy. Despite the good intentions behind the movement to get people to code, there are almost as many skeptics as supporters, but coding is probably one of the ways to achieve digital literacy. Even president Obama has join in the movement, according to Wired<sup>1</sup>, he became the first president ever to write a computer program.

The first important thing for this project proposal is that this massive movement has developed many interesting ideas and interactive environments, most of them on the web, able to nurture and ignite the coding spark for learners which are not necessarily computer science professionals. As an example, recently professors from the COMEM<sup>+</sup> department at the HEIG-VD university decided to captivate their students using Blockly for visual programming. It makes the course less boring, it helps to increase learning motivation, it's almost fun and it encourages interactions within the group.

So there are many interesting new sites which help to learn programming : Code.org<sup>2</sup> has the vision that every student in every school should have the opportunity to learn computer science ; Code Learn<sup>3</sup> believes that the best way to learn a technology is by building an application in it rather learning its syntax ; Code Academy<sup>4</sup> builds the best learning experience inside and out, to learn, teach, and create the online learning experience of the future ; Code School<sup>5</sup> teaches web technologies in the comfort of your browser with video lessons, coding challenges, and screencasts.

Also, given the Wikipedia definition of SQL (Structured Query Language) as "*a special-purpose programming language designed for managing data held in a relational database management system (RDBMS) or for stream processing in it*" there are some special sites focused on learning to code SQL: Schemaverse<sup>6</sup> offers a gamified SQL learning experience ; SqlZoo<sup>7</sup> includes tutorials and reference to support people learning SQL though interactive access to several SQL engines and practical exercises ; Galaxql<sup>8</sup> is a desktop-based interactive tutorial to learn SQL with more fun by changing the shape of a spinning galaxy

1 <http://www.wired.com/2014/12/obama-becomes-first-president-write-computer-program/>

2 <http://code.org>

3 <http://www.codelearn.org>

4 <http://www.codecademy.com>

5 <https://www.codeschool.com/>

6 <https://schemaverse.com>

7 <http://sqlzoo.net>

8 <http://sol.gfxile.net/galaxql.html>

than to do some exercises that splits out tables ; MISSQL Command<sup>9</sup> is a gaming web application which invites the learner to become a MISSQL Commander and to save the world from nuclear annihilation using SQL queries.

One more interesting game-based learning project is the SQL Island<sup>10</sup> from University of Kaiserslautern. The player is marooned on an island and meets villages with inhabitants who only understand the database language SQL. The player has to succeed in several levels by speaking SQL with inhabitants in order to find a solution to leave the island.

The major point for this project proposal is that all these sites do not tackle SQL spatial to manipulate the spatial reference of data. Geodata analysis through SQL spatial queries requires to learn about specific data types and thematic, geometric and topological operators (see Spatial Queries e-lesson from GITTA platform<sup>11</sup>). **Therefore, this project wants to explore new ideas and interactive environments, from interactive tutorials to game principles and simulations to reach the training goal of learning SQL spatial.**

Back to the SQL Island, we can imagine a geospatial perspective by presenting a map in the game interface and by introducing game challenges which require spatial queries. This is what this project is about, studying the feasibility of kind of "interactive SQL spatial tutorials" and "SQL spatial games".

The project aims also at the development of one or more prototypes to illustrate the result of the study when relevant. This work would require to consider existing systems that facilitate the development of serious games like the Wegas<sup>12</sup> authoring system or the Tourney<sup>13</sup> content independent game framework. Notice this serious programming game<sup>14</sup> based on Wegas system in which the player has to program in Java in order to move a character accordingly in a maze and rescue other characters.

Finally, the project is supported by the Geographic Information Technology Training Alliance as a special project to give new value to the e-learning content offered by the GITTA platform. The project will be hosted by the University of Applied Sciences and Arts Western Switzerland.

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9 <http://missqlcommand.com>

10 <http://www.lgis.informatik.uni-kl.de/cms/courses/informationssysteme/sqlisland>

11 [http://www.gitta.info/SpatialQueries/en/html/SpatialQueries\\_summary.html](http://www.gitta.info/SpatialQueries/en/html/SpatialQueries_summary.html)

12 <http://www.albasim.ch/en/wegas-2>

13 <http://web.fhnw.ch/plattformen/blogs/tourney>

14 <http://www.albasim.ch/en/our-serious-games>