Alexandre Macabies – Portfolio

Software development

Carcassonne Game

School project
Spring 2013

Technologies
C, SDL, OpenGL, SVN

Code repository
Bitbucket link

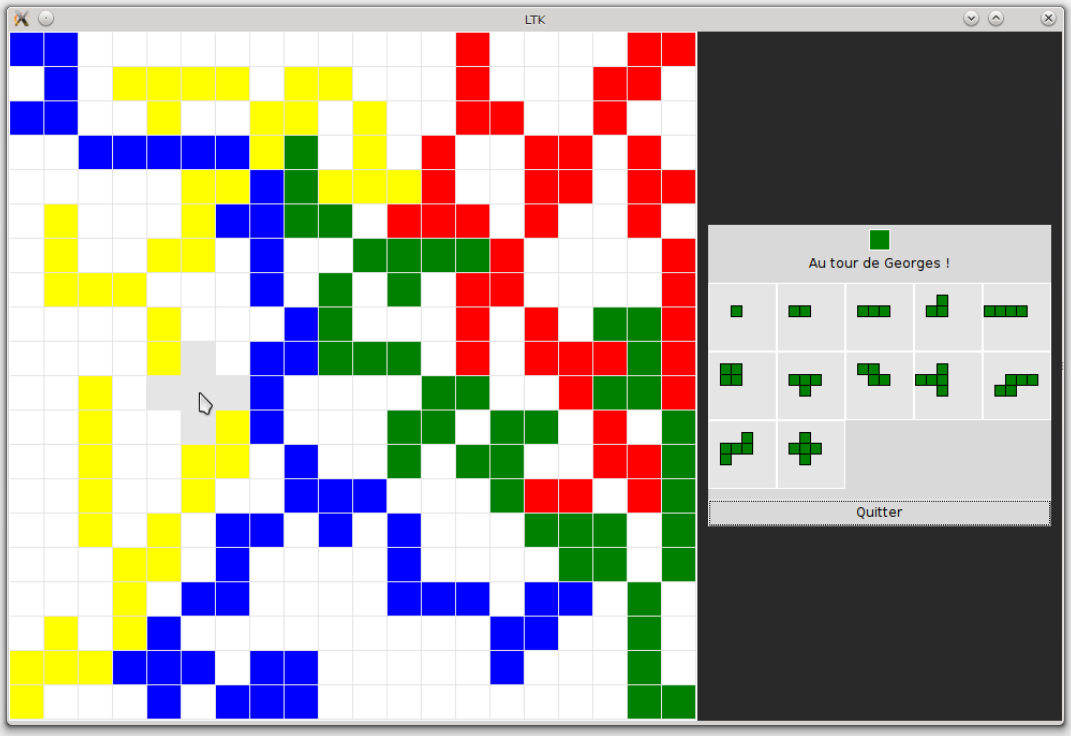
This project implements a graphical interface to play “Carcassonne”, a game where the goal is to organize square tiles on a board to gradually build a map that consists of fields, castles and roads. Each player earns points by putting the tokens belonging to him on the said structures, when possible. The winner is the player with the most points at the end of the game.

This school project was conducted with four other colleagues. The main goal layed in the application of our **graph data-structure** course.

The main difficulty layed in the design of efficient algorithms to **compute contiguous paths** within the graph induced by the tiles, as well as managing a fairly advanced **graphical user interface** in C, which is a low-level language with almost no standard data-structures.

Alexandre Macabies
(redacted)
38000 Grenoble / FRANCE
alex.macabies.fr ☎ (redacted) ✉ alex@macabies.fr

Blokus Game



School project
Spring 2013

Technologies
Common LISP, Tk

Code repository
Bitbucket link

This project implements a graphical interface to play “Blokus”, a four player game where the goal is to organize asymmetrical pieces on a rectangular board divided into squares, so to be the first to place all pieces.

This school project was conducted with four other colleagues. The main goal layed in the application of our **functionnal programming** course.

The main difficulty layed in the design of efficient algorithms to detect eg. game ending or forbidden moves. We also implemented three **artificial intelligences** with increasing difficulty, so one can play the game without human opponents. Once again, we had to deal with the design of a basic **user interface** using Tk bindings in LISP.

Transportation system

School project
Fall 2013

Technologies
Java, OOP

This small school project showcases the use of **object-oriented programming in Java**.

I had to implement various Java classes representing buses and passengers with modularity in mind. Indeed, using inheritance and interfaces, it was possible to simulate different passengers behaviors. Every single feature had to be **fully unit-tested**.

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(redacted)
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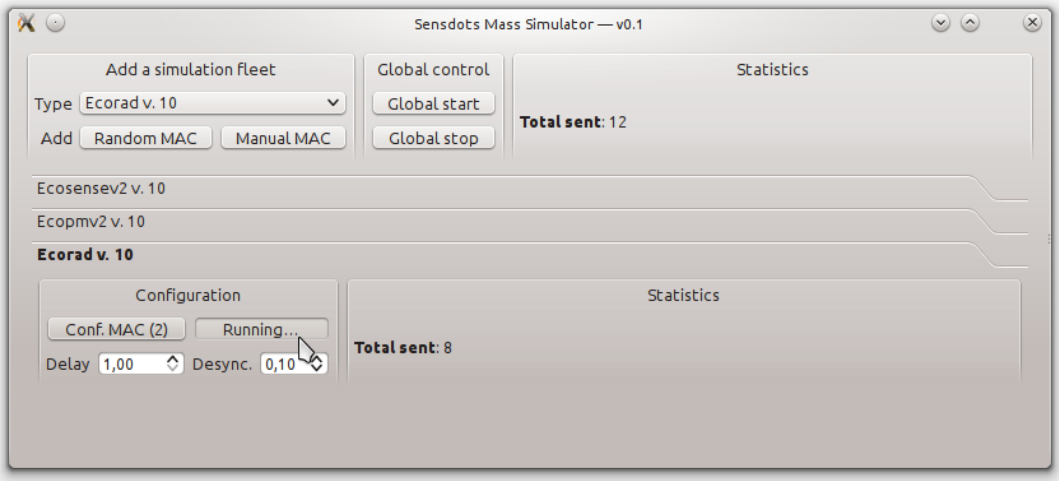
Senspod simulator



Internship
Summer 2013

Technologies
Python, Qt, Websockets

Sensaris Inc. is an "Internet of Things" company designing and producing, among other electronic equipments, wireless sensors which communicate with the Internet over Bluetooth and 3G.

During my two-month internship in the company, I had to develop a simulator which sends some metrics every second, simulating a large number of fake sensors communicating with *Sensaris* servers. This simulator was used to **load test the architecture** by sending a massive amount of data and measure the system response to this charge peak.

Because of the technologies involved (Qt and networking), I had to deal with **multiprocessing and threading issues**: the simulator UI had to remain responsive even when the software was sending kilobytes of data each second.

IRC library

```
def connect(self, host, port=6667, use_ssl=False):
    '''Etablish a connection to a server'''
    logger.info('Connecting to %s port %d ...', host, port)

    self.sk = socket.socket(socket.AF_INET, socket.SOCK_STREAM)

    if use_ssl:
        import ssl
        self.sk = ssl.wrap_socket(self.sk)

    self.sk.connect((host, port))
    self.sk.settimeout(512)
    self.fsock = self.sk.makefile('rb')

    logger.info('Connected successfully')
    self.connected = True
    self.enabled = True
    self._callback('on_connected')
```

Personnal project
2010

I am a big fan of the **Internet Relayed Chat** (IRC) protocol. I participate in numerous discussion channels where I can exchange with other people from all over the

Alexandre Macabies
(redacted)
38000 Grenoble / FRANCE
alex.macabies.fr ☎ (redacted) ✉ alex@macabies.fr

Technologies
Python, IRC

Code repository
Bitbucket link

world.

As the protocol is widely used by developers, there are thousands of automatic software using IRC for entertainement purposes (IRC games), realtime reporting tools, and so on. Having written numerous of these so-called **IRC bots** myself, I was not convinced by any of the freely available IRC libraries, so I developped my own with a friend and we **open-sourced it** under the name `pypeul`. As of 2013, dozens of people reported using it on a regular basis.

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(redacted)
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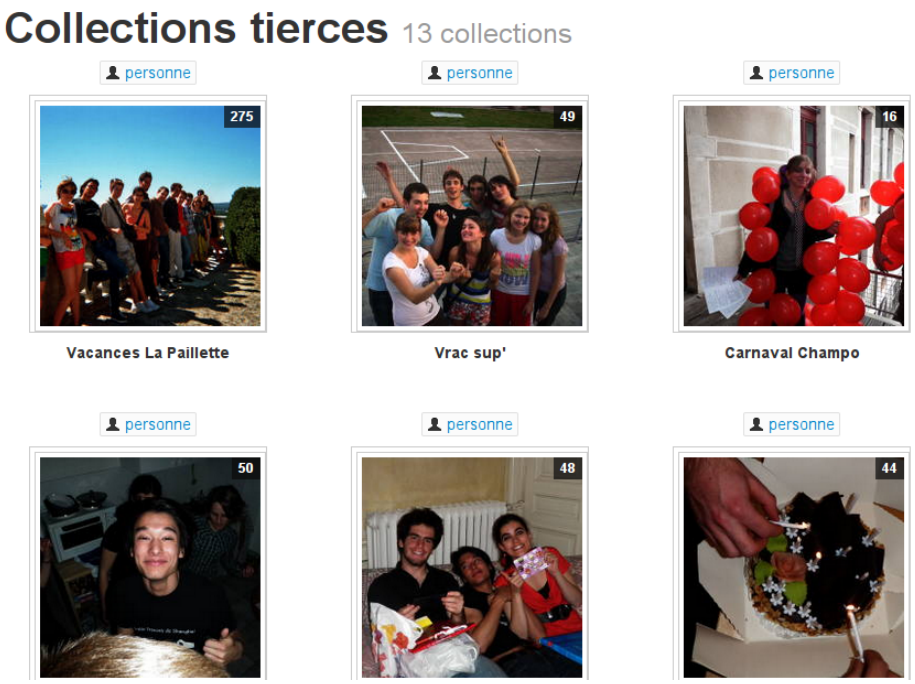
alex.macabies.fr ☎ (redacted) ✉ alex@macabies.fr

Web development

Photo sharing website



Personnal project
Summer 2011

Technologies
Python, Django, SQL, Amazon Web Services

My friends and I needed a private place on the Internet to **share some pictures** and comment on them. An important requirement was the ability to **download a whole album** as a ZIP tarball.

Obviously, there are already some public websites to do this kind of things, but every one of them had a flaw: *Facebook* has album size limitations, privacy issues and can not create tarballs, *Flickr* has no precise enough sharing settings, and so on.

As many of the websites I design, this one is powered by the **Django framework**, built on top of Python. The numerous pictures are hosted on Amazon Simple Storage Service, a widely used **cloud service** with competitive prices.

Alexandre Macabies
(redacted)
38000 Grenoble / FRANCE
alex.macabies.fr ☎ (redacted) ✉ alex@macabies.fr

Web services for students

Personnal project
Summer 2013

Technologies
PHP, Python, Django, SQL, Websockets, HTTP servers, DNS & SMTP configuration, server administration

Website link
View all services (in French, may requires authentification)

In order to ease the life of the **1000+ students** of my engineering school, ENSEIRB-MATMECA, I developped a set of various **online services** providing a community-driven wiki, user-fridenly timetables, student pictures, exam archives, games, *etc.* The websites gather more than two thousand (and counting!) visits every day.

I am the **president of the school computing club** which provides, in addition to the above services, web hosting solutions for the school clubs and associations as well as **lectures and trainings** on computer science related topics.

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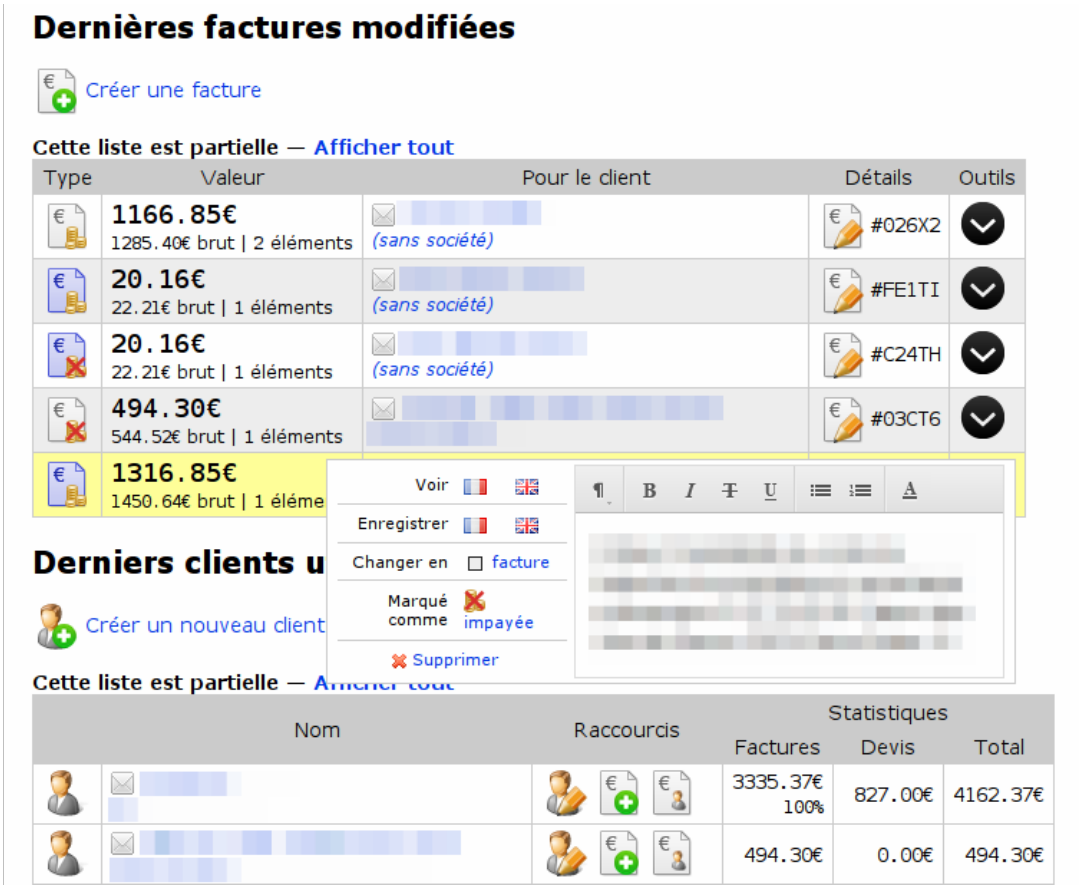
Invoicing system



Freelance
Winter 2010

Technologies
Python, Django, SQL, PDF generation

This project was realized on behalf of a **professionnal translator** who needed to manage his clients and translation works: namely, maintaining a database of customers and being able to automatically **generate clear, well-formed PDF invoices**.

I could have created a native desktop application for this purpose, but the client wanted to be able to view and modify its invoices from everywhere. That's why I chosed to develop a **web-based, multilingual invoicing system**, powered by Django. Three years after its delivery, the client is still enjoying the application.