# Questionnaire

## Programmers

Thanks for taking the time to fill this out! It’ll help us to get a better understanding of you as a programmer and person. We will then follow up on this with an interview to discuss your answers. Some questions may seem a bit vague, but they are intentionally so.

### Question 1

List all games or other relevant projects you’ve worked on with a detailed description of your tasks (if you haven’t done so in your CV already)

**Spice Bandits (T-Studio/On-5; iOS).** I have written a majority of code for the backend (PHP; MySQL). Also I did some network administrator tasks with AWS EC2 instances.

**Holy Wars (On-5; Android).** I did same things as for Spice Bandits.

**RollerCoaster Tycoon 4 Mobile (Atari/On-5; Android/iOS)**. I changed many things in O5 framework by developing other games in On-5/T-Studio (it’s basically the same company), that’s why I was some kind of technical consultant for guys from Atari and my colleague Rimantas (he was lead backend developer for this project)

**TipTop: The Last March! (T-Studio/On-5; iOS)**. The first this game doesn’t used buy-more-levels model to unlock full game. My task was to implement such change on backend. (PHP; MySQL).

**We Doodle (Ngmoco/On-5; iOS)**. I was I a guy who tried to fix all unplanned bugs when this game launched (PHP; MySQL)

**Charadium 2/Draw Mania (On-5; iOS)**. On-5 brought back rights from Ngmoco for “We Doodle” and renamed this game into “Charadium 2”. My job was to help them to migrate all data and configure AWS servers. Later this game again was renamed to “Draw Mania”. I helped a bit with new website.

**Project DickValley (Greatest Games; iOS)**. I was hired as backend developer for some “Clash of Clans” clone with this very strange codename (at the time when I joined the project this codename was everywhere on client sides code). For this project I decided to use AWS, PHP, MySQL and Websockets. I can’t remember why and how it happened but at one time I also coded in C# some networking code. The client used Unity engine.   
  
I don’t know what happened with this project. I leaved it because my results were not good enough for my boss (I can say that this happened for my two co-workers too; I think my boss wanted much more than any average developer like me could do).

**Karas (Win).** This is my research project that I as an example in my master thesis at Vilnius Gediminas Technical University. This game demonstrates example how to use P2P for multiplayer game. It’s possible to find this game on my GitHub account. I wrote this game from the scratch and written in VisualBasic.Net.

**StupidFall (Win).** Very simple game written for competition to write a small game with not more than 50 lines. The source code is also available on my GitHub account. The game was written in FreeBasic language.

**Seabattle (EggDrop AddOn).** This game was written by myself as add-on for popular IRC bot EggDrop. Two players can play classical sea battle game. Everything is written in TCL language and this add-on uses MySQL database. The source code is available on my GitHub account.

**Childhood disasters (HTML5)** – I and my friend Vaigintas tried to make a game at GameJam 2014 and this is the result, what can be done without any engine from the scratch. The source code is available on GlobalGameJam.org website.

Also I have developed few small promo games for Gaumina. But right now I can’t remember names and anything about how these games worked. I can remember that we used for this project Flash client side and PHP on backend (I have worked with this part).

### Question 2

Consider a network server application (very simple database-server, compare “MySQL-Remote-Access”) which must be able to handle thousands of client requests simultaneously. What sort of programming techniques and software patterns would you suggest to implement a scaling system? How would you scale with an increasing number of clients? How would you utilize multiple CPUs and multiple machines?

At the first I want to say, that there are so many books about this topic! That’s why I don’t think so that I could give a full answer to this question.

It’s a good idea to write a code for database thinking about master-slave. I think the best but hardest implementation would be if developer could execute queries on a same instance of database class which automatically selects how master or any of slave database servers. Master instance should be used only for writing data, and slaves for selecting. This is because in most cases select operation is more frequent and client applications wants to get data as soon as possible. Script should select automatically slave nodes by a usage (lowest usage database server gets new task). For all this stuff I would use Factory pattern for creating all database connections, Filter pattern for filtering queries to route them to correct database instance (master or slave) and Singleton to get an instance of main database entry point.

All configuration of all database servers could be defined in some PHP file as array. In this case it would be easy to include another slave when there is a such need. Everything else should work automatically.

Maybe it’s also a good idea to add sharding support (but I think developing something that use sharding sucks, but in some cases – when DB is too big and too busy, I don’t think that there are no any other options to use). Sharding configuration can be also accessed as array and defined in PHP file.

I think InnoDB type is a good choice for tables in most cases. Because it uses row locking technique and doesn’t needs manual optimizations for tables unlike MyISAM.

Correct indexes on all tables is also important thing. Wrong indexes can be a main problem why queries are executed so slowly. Indexes must be added on every column group which are used in where clauses of queries.

Memcache, Redis or at least a disk should be used to cache everything that could be cached to lower usage of MySQL servers and also of processors for server side scripts. Cycles in scripts are very hungry for the CPUs. So it’s a good idea to have less of them as possible and cache somewhere results.

With work queues like Beanstalkd is possible to divide some background tasks between servers.

To divide all incoming request between servers is a good idea to use some HTTP accelerator like Varnish. This accelerator would select any of existing web servers, redirect there an incoming request and return a result to a client.

I think it’s also good idea to use tools like Deploybot to create a place from where all servers would be updated by one click or just a commit to a linked Git/SVN repository. Such tool can save a lot of time for deploying a code.

I know that AWS have similar tool, and there is also auto scaling support for instances so I think it would be easiest place to start a huge network application.

TravisCI, CodeShip.io, **Scrutinizer** and similar services could be useful also. These services can run automatically tests before merging work branches in to master branch or before deploying code on production servers. Sometimes these services can catch some unnoticed serious bugs.

### Question 3

What PHP Frameworks you have worked with or know?

Yii, Symfony 2, CakePHP 1.x, Zend Framework 1, Slim, O5, Silex, Moon, IPF – worked

Laravel, Code Igniter, Nette - heard

### Question 4

What is the difference between an interface and an abstract class?

Every PHP class can implement multiple interfaces but can extend only one abstract class. Also, interfaces can just define what methods class must implement and abstract classes can have fully functional methods and/or variables.

### Question 5

What are some PHP Design patterns you have worked with?

Dependency Injection, Factory, Singleton, Prototype, Front Controller, Iterator, Filter, Observer… Maybe there were more but right now I can’t remember.

### Question 6

What methods would you use for Debugging & Profiling a PHP application?

For profiling: sometimes I use XDebug PHP extension (with trace options enabled), sometimes I use blackfire.io tool.

For debugging: XDebug (without trace options – for speed), or if I’m getting some 500 error I’m trying to find nearest place in a code with *var\_dump* and *die* before code hangs. Of course, I’m trying before that to find something useful in log files of a project (if available) or of a web server.

### Question 7

Consider a REST API Service implemented in PHP. Please compare hosting that service on dedicated servers in your private data center to hosting it in a cloud service like AWS or Microsoft Azure. What are the pros and cons of each approach? Do you have experience with either of them?

I haven’t used much Azure, but I have used many times AWS. When you launch a new service, it’s hard to predict how many servers do you really need. You are lucky if your prediction is not far away from the true. But if not, if a load is huge your service can work very slow or can stop working at all. Maybe it’s not bad thing if you have some extra hardware for servers that you can launch fast, but if that’s all what You have - you can lose trust of all your potential customers. It’s not hard to gain it again because that buying and configuring new server will take some time and bad experience for customers is the same as loosing trust.

From other side, too many running unused servers it’s the same thing as burning own money.

These issues can solve cloud hosting services like Azure or AWS. You can easily launch another server or stop existing manual or automatically. Also, you don’t need to think about some other problems like what if your psychical server stops working at all. Cloud hosting company solves all of them. But there is a bad thing – it will cost more than hosting in own servers.

Also, these cloud services solve another problem – content availability in different regions. You can easily launch how many servers as you needed per region to lower request time for a user. Also it can be useful if regional servers need to use something specific libraries or by pass regional filters. Of course, that is possible with own data center too. But in that case you will need to have not one but several at different world locations. And to maintain these servers it’s not easy thing, cost time and money.

I think the answer to the question “What is better? Cloud or own servers?” depends mostly if it’s hard to predict a load for a service and how many times resources at peak time differs from any other time. If there are huge differences I think cloud is a better option.

### Question 8

Do you have experience with PHP frameworks? If so, please describe what you used them for and your personal impression of them.

Yes, I do!

**Yii.** I have used it for developing Cloudcampus.me/Learning.Social website (new features, fixing bugs) and a bit for Charadium.com (what I actual did there I can’t remember)

This one is something between complexity of Symfony 2 and simplicity of Zend Framework 1. It’s not hard to learn, has many features for small and for very big web sites/web services, but doesn’t have so many possibilities out of box that Symfony 2 has.

**Symfony 2**. At “Way of Brave” company I have worked in the team to rewrite Erodate.pl website and for that we have used this framework.

This is a great framework for developing very huge websites and I think it’s best choice for developing some corporate style applications.

Symfony 2 was built by thinking about using dependency injection everywhere. It’s cool thing. It’s easy to replace some parts of functionality by just changing names of classes in configuration files. Also, it’s possible to create some variables on the fly from definitions in function comments.

What I dislike about this framework is a recommendation to use YAML for all configurations. I think YAML like CoffeeScript is better suitable to use with Ruby or/and similar languages than with PHP. I find these two languages and this data format somehow similar. So, it’s easier for developer to switch between two of them.

**CakePHP 1.x**. I tried with my friend Šarūnas to start website (SkyGames) about e-sport games. He said that CakePHP was best framework and I thought why not. This project died quick enough but all source it’s available on GitHub.

I think this was the first framework, which made developing new websites much easier. With CakePHP is very easy to make new project structure (with all required classes, views, folders) but from other side sometimes it’s not easy to get an idea how to do some things right.

**Zend Framework 1**. My old classmate Algimantas asked me for the help with *smallplanet.aero* (to fix some bugs, add new languages). I though why not. Soon I found out that this website is written in Zend Framework 1. So I got a some kick to my ass to learn this framework.

What I like most about Zend is how this framework is written. I think that it’s easier to understand how this framework works than any other frameworks on this list. All names of classes use logical names and if you don’t know what you really need it’s not hard to find because you always have an idea where to start looking.

From bad side this framework lacks database migrations, dependency injections and some other common features. Also, build-in classes doesn’t use namespaces.

**Slim.** I have used this framework only once as test for a job. I needed to choose framework and write a small webpage where users could register GitHub issues. So, I decided to give a chance to Slim framework.

The result can be found in GitHub. Repository name - *dev\_test\_mekdrop*

This framework is like ExpressJS framework written in PHP. It doesn’t have real asynchronous support (because PHP doesn’t have yet) but with it is possible to write a code in same style like writing code for ExpressJS in JavaScript.

**O5.** I have used this framework for almost every game in On-5/T-Studio (except Charadium/DrawMania). It’s written to be used as backend for mobile apps.

I think once I finished my last project at On-5 I have somehow improved about 90% of the code base of this framework. I have added there automatically selection of master or slave database nodes, MongoDB, Memcache support and very primitive DB structure migrations.

**Silex**. I used as framework for a job test for “Way of Brave”. Source code is available at GitHub. Repo name - *Paveiksleliai.Uzduotis*

It’s like a lite version of Symfony 2. I think it’s easier at the start but not a good choice for very large projects because it’s lacking build-in expandability like Symfony 2 does.

**Moon.** I’m involved in Games.lt project and sometimes I fix some bugs there. This website was written by someone from the company called “MetaSite”.

This framework was written when PHP 4 was still popular. Some parts of the code were update to PHP 5.1. So, basically it’s very outdated. Also, this framework uses very strange template system. It’s possible in every file to store multiple templates.

**IPF.** I’m involved also in ImpressCMS project (it’s open source content management system). And IPF is a custom framework that we are using there. It’s some of variation of view-model-controller.

### Question 9

For a client/server based game (e.g. Browser-Game) which security measures against hackers or cheaters would you take (and why)? What kind of attacks would you expect from them?

I think that most of security issues happens because a server doesn’t validate all incoming data from a client. F.e., if gold is generated on a client and it sends to server with REST requests, it’s not hard to change values. In that case is good idea on the server side to calculate possible values and compare with an incoming result.

If server use SQL database and doesn’t verifies if all incoming data were escaped correctly there is a chance for SQL Injection (f.e., hacker can drop all tables or make him an admin).

If this is a multiplayer real time game, server must compare statuses/data between clients and if something is wrong there must correct/update all bad data. Without such comparison there is a chance that some player can get more resources or some invulnerability.

Also, it’s good idea to use HTTPS protocol and maybe some other encryption. Without it’s much easier to sniff authentication data from users and use it for gaining some admin rights.

For server admin is also good practice do not use password based authentication for SSH servers. RSA key based authentication is much safer choice. It can take much less time when hacker is trying to guess any password than key.

Also it’s a good idea to restrict access from backend code to database. I mean it’s not a good idea if it’s possible to create or to drop databases or tables with same login as used by the backend. This can help to lower the alert level which arise from some SQL injection (for example, when someone drops database, all services probably will stop).

Preventing direct connections to the database from outside than web servers – is another good idea. For hacker it’s harder to get an access to the database.

Correct *chmod* for all files on the server is also required. Because if there is possibility to modify files from backend code, there is a chance that some hacker can upload or create some evil script that can be execute every time one a request from a client is made.

### Question 6

What are your favorite games? What do you like in them, what do you dislike?  Any ideas how they could be improved?

**Dungeon Keeper**. I am a big fun of this series. I still play sometimes “Dungeon Keeper II” game but I can’t say that I love what EA did with the latest version of game for smartphones. I think the way how this game was made is totally wrong. I think it’s not a bad idea to turn this series into free-to-play but it’s bad to ask players to spent money for such things like digging. In both two games this was a free and I could dig tunnels very fast. I think they have missed that this game not about creating most awesome dungeon but instead creating a place with own rules and conquering new territories. I think that “Dungeon Keeper” is a perfect free-to-play game for tablets and mobile but it should work more not as a dungeon builder but it should work as multiplayer real time strategy game. Every player could fight each other and goal would be to destroy enemies’ hearts and expand own territory. If player loose, he could choose to spent real money for instant rebirth, possibility to choose location where to start again or doesn’t pay at all and wait. I think there could be other useful items in the shop. Also, I think it would be a good idea to use natural disasters like flooding or earth quake that would prevent to use some owned territories for a while. Shop items would help to solve these type of problems.

I think this a better way, because new mobile players don’t care much about “Dungeon Keeper” name, but all old players don’t think that current mobile game is a good game. I think my way would more suitable for them.

**Unreal**. When first time I saw footage from this game on Cybernet TV show, I changed my mind about computer graphics. I think that time I thought “Wow! That’s amazing!”. Today maybe the graphics doesn’t look very good, but then everything was awesome. I think the game mechanics still rocks, so if I have a chance to change probably I would like just to update all graphics and add some skeletal animations in multiplayer matches.

**Rollercoaster Tycoon.** I spent many hours playing the first game. I love other two games too. It’s really awesome to build a theme park! I really don’t know what I should change in these games. Just maybe a build-in DLC shop with new mission maps would be a great idea… ah… also first two games haven’t possibility to speed up time. Sometimes it’s very good thing! Sometimes happens that player must just don’t turn off computer to finish win a game.

**Moorhuhn.** Ilove to shooting flying chickens and hidden somewhere in visible environment, but I disliked that premium version is too similar to demo version. I would like at least to add multiple locations.

If I have a possibility to create another game in the series probably I would do a remake. I will reimagine the series. I think it would be amazing to create an arena shooter where players on the map try to catch chickens and fire to other like Charlie Sheen did in “Hot shots 2” movie. This game would have others strange but funny modes too! I think it could use free-to-play model like Quake Live does.

**Chickens Can’t Fly.** Another game with chickens but this one is about doing experiments. I’m missing only one feature in this game – possibility for friends or/and other players to create own experiments and share results with other players.

**Deus Ex: Human Revolution.** I really like gameplay mechanics of this game, story, but I don’t like that it uses basically the same ideas for level locations as previous games of same series: headquarters, slug district, market...

### Question 10

Please list your favorite industry references (Programming, Graphics, etc.), such as books or websites, and why you liked them.

I think StackOverflow.com and subsites are my primary place for searching of programming answers.

GamesIndustry.biz is cool place to find I think most interesting news about what is going with GameDev community.

At Gamasutra.com is possible to find also many interesting news, but primary reason why I love this place is blogs. I really like to read how others developers solves different problems and what they think.

### Question 11

What middleware experience do you have? What specific tasks did you use it for?

I’m not sure what could be called a “middleware for PHP”. If it is some multi payment system, I have used T-Pay and Paysera. If this includes also template engines, I can say, that I have used Twig, Smarty, Dwoo. If this is some database abstraction library, I can say that I have used Doctrine and ADO DB Lite. Image manipulation? WideImage! RSS fetching? SimplePie!

Probably Composer can be on this list too. It’s very good tool for managing libraries for any PHP project.

### Question 12

What sort of work environment (team size, working hours, meeting frequency, etc.) work optimally for you? How do you like to be managed?

I’m an introvert and like many books says I don’t like much big open spaces where I need to work. From other side I don’t like if I don’t have some free space near me (I don’t know how to measure the space, but if I can touch my coworker or wall without moving and any other effort, I don’t think that is good thing).

I think team of 10 people is good enough. I can work with larger team too but I need more time to be able to perform good. At the first I like to learn more about my coworkers.

I don’t like to going to meetings, so that’s why I would like to have as less as possible. From other side I don’t believe that is possible to work without meetings. So, maybe… no more than one time per week…

It would be awesome to come to the office between 9-10am and sit there next 8 hours (and maybe sometimes more) with a lunch break.

### Question 13

What strengths do you have as a programmer and as a person that you would contribute to Sproing and making great games? What are your weaknesses?

For me it’s not easy thing to describe myself. I don’t believe that I can give any true description. I think that is a case when crowd mind can do a better work… but here we go…

I think my weakness and strengths comes from the fact that I’m an introvert. I think it’s easier for such person to understand how complex computer programs works without any external help but it’s harder to express thoughts correctly.

Also I’m INTJ and I think the description of this MBTI type fits for me as well.

When I’m doing any task I’m trying to think is there any way I could improve somehow current project. Maybe some of these thoughts could be useful for Sproing games? I really don’t know what can I offer for Sproing. I’ll try to do my best and see where is everything is going… Maybe I could be for Sproing a secret ingredient to make all existing games of the company more delicious? Really, I don’t know…

I think I should say, that my English is not perfect (I think you have already noticed from my all answers). It’s not my native language and right now I use this language mostly for reading technical texts and news and chatting with others by email or/and Slack, watching TV (Discovery, Travel, CNN, Euronews…)

Slack I use mostly for ImpressCMS. And I talk there about ideas and problems with some others developers. And emails I use mostly for dealing with press relations between Games.lt and game developers and publishers. Usually I’m asking for game copies or review codes for my colleagues.

In any case, I think that my knowledge of English is one of my weaknesses.

Also, sometimes I speak like Yoda.

### Question 14

What do you think are the biggest challenges for the games industry in the next few years? What kind of strategy do you think Sproing (or a company like Sproing) could use to prosper?

If I could answer to this question probably I would not work as developer. Probably I would have own game development company (yeah, most developers have such secret wish) … but here I am searching for some next awesome place to work… so I’ll try to answer…

I think the biggest challenge is to stay on the market by creating such games that players would love to play and would like share with friends. It’s hard to create good looking game but it’s much harder to create something that players would love it and share it with others.

A good example of this issue is what happened to Rovio. They tried a number of times to create another successful game but for some reason players wanted just another Angry Birds.

Another challenge is how to stay on company management track. Always there are many new waves of methods, technologies. It’s not easy to choose and update correct ones that makes all workers happier and better. I think good balance in this area is a key to unlock doors for better results overall.

That’s it! Thanks for filling out the questionnaire!

n case you didn’t provide us with this information already, please make sure we’ve received your full CV, as well as a letter describing why you would like to work at Sproing and what you believe you can add to our team.