

WHAT  
the  HACK?!

# The Hacklab Setup Guide

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# Introduction: "Hacklab"



## 1.1 Introduction

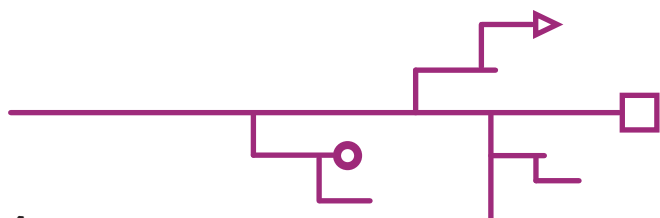
The world around us is changing. We are moving to a society where we cannot live without technology. This has many advantages, but it also creates risks. Cybersecurity risks are one of the biggest threats to the society today. Cybercrime is a big industry that targets individuals as well as businesses and governments. In the coming years, organizations and companies will have to invest to protect themselves against this type of threat. But where do you start? Companies and governments worldwide are struggling to attract young, talented employees who know the cybersecurity risks and can deal with them. The shortage of these employees is caused by a lack of skilled job seekers and because (potential) employers are looking in the wrong places. Existing initiatives are often aimed at specific education levels and this cuts off a large part of potential talents. The shortage of specialists seems therefore greater than necessary, because the young talents are out there! The biggest challenge is to find and connect with these youngsters. This requires an innovative approach that offers space for organizations to find talent and for the talents to develop.

That is why the foundation Cyber Safety Northern Netherlands started with the opening of a Hacklab. A large number of organizations are working together to work on cybersafety and resilience. In order to formalize this cooperation, the Cyber Safety Foundation Northern Netherlands has been setup. The aim of the foundation is to contribute to the future of the threat of cybercrime. The Hacklab is a part of this.

The Northern Netherlands Hacklab is a safe and secure place that lets young talented internet users (in the 15-25 age bracket) develop knowledge and gain experience within the cyber domain at their own level and pace. The Northern Netherlands Hacklab opened its doors in November 2018. To reach and recruit candidates, the foundation has sought close collaboration with local authorities across the Northern Netherlands, the Employee Insurance Agency (UWV), the REA vocational college, and a number of health care institutions.

The main goal of the project is to start Hacklabs in all EU countries, especially in the countries of the partners in the 'What the Hack' project. This Hacklab Setup Guide is a manual for the partners to help start up a Hacklab.

This Setup Guide starts with an explanation about a Hacklab, the participants and the methodology of a Hacklab. Then a paragraph follows about how to start a Hacklab. The next paragraph is about the organization of a Hacklab. Last, a few useful links and examples will follow about the lesson material and the program.







# The Hacklab way

## 2

### 2.1 The Hacklab further explained

A Hacklab is a place that lets young talented internet users (in the 15-25 age bracket) develop knowledge and gain experience within the cyber domain at their own level and pace. The Hacklab is open from Monday to Friday. The participants can come to the Lab to work on the projects, individual assignments or to study for a certificate. Assignments for the participants come from the Hacklab itself and from (partner) organizations outside the Hacklab.

A possibility for a Hacklab is to organize "Hack the Friday". Guest teachers give a practical lesson in one of the cyber subjects. The participants can develop their cyber skills on various areas like pen testing, software development, data science or cyber security.

There are opportunities for the students to get certificates from the Cisco Academy. This is a Networking Academy that is focused on developing the workforce of the future with education. In the future it should be possible to receive certificates from other (online) learning environments and international institutes that are highly regarded.

Besides the practical lessons with the teachers, the participants of a Hacklab work on practical exercises and projects. They will participate individually and in (project) teams. Participants with more experience can teach and help new participants about pen testing, software programming and hardware when they work in teams. The practical assignments and projects give the participant the opportunity to work on their own portfolio which they can also use to find a job.

### 2.2 The Hacklab Participant

The Hacklab project is especially for youngsters outside regular education. For example: gamers, school dropouts, people within the autism spectrum or people who miss a challenge in their current education.

To participate in a Hacklab, the most important thing is to have interest in the cyberenvironment. The willingness to learn everyday is more important than the previous training courses and education. Together with the participants, a Hacklab wants to discover the talents they have in the cyber field and beyond. The main target group of a Hacklab is in the 15-25 age bracket. In practice, it is not common to refuse older participants, if they fit within the philosophy.

Experiences so far show that when people discover their talents, they are eager to develop them further. A Hacklab offers the support that each individual participant needs. Every pupil is different, so the mentors of a Hacklab look for a suitable development path for the participants. The starting point is that talent cannot always be captured in diplomas or training, but the participants in a Hacklab will gain demonstratable skills.

### 2.3 The Hacklab Methodology

The participant is central in a Hacklab. What is very simple for one person, is a very big step for another. That is why each course is tailor-made. The participant is in charge of their path and a Hacklab facilitates. The mentors will look for a suitable program for each participant. Hacklab students are in need of special support, because regular education has failed them.

Before and during the process, objectives are documented, tested and adjusted where necessary. Every week, the mentors and participants will pay attention to the ethical side of the knowledge and assignments.





# How to create a Hacklab?

This is an explanation of how the Hacklab from the Netherlands was created. This can be used as inspiration for other organizations that want to set up a Hacklab.

The Hacklab Northern Netherlands is an independent organization supported by three stakeholders. These stakeholders are education, the (local) government and companies. Collaborations must be entered with schools, governments and companies. To create a new Hacklab it is important that it is independent. Independence is important, because companies have no influence that way. The Hacklab is therefore always open to all candidates. The moment you are financed by a specific person or company, it determines the route. Remain independent as a foundation, so the policy cannot be influenced.

## 3.1 The organization of the Hacklab

The Hacklab is a foundation. With several stakeholders this foundation was established (i.e. vocational educational institute Friesland college, Local Municipality Leeuwarden, private company MKB Cyber Campus). The governance of the foundation is in the hands of a board, consisting of representatives from the three stakeholders. The board bears responsibility for the finances and the operations.

### The finances

The foundation receives subsidy from the Municipality for each participant. The Hacklab also receives incidental funding from other partners. It also generates an own income by rendering services to private companies. These services are for example: pen testing, IT scans and other security issues. From this combined income the Hacklab is run.

Other ways of funding are companies that are interested in new employees. Ask them for a contribution and use the shortage on the labour market. Companies are so busy that they don't have time to train new employees. The Hacklab can play a role in this, because it can train people specifically for companies. Approaching the government or individual foundations for collaboration and financing is also an option.

### The location

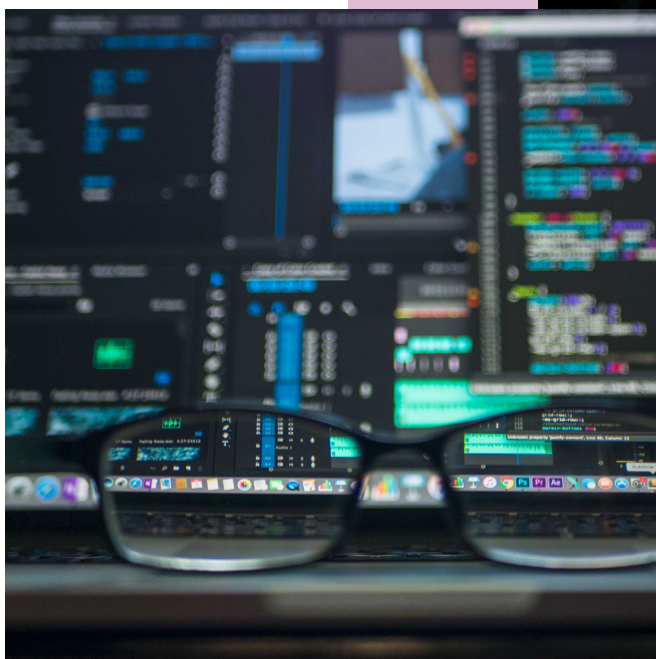
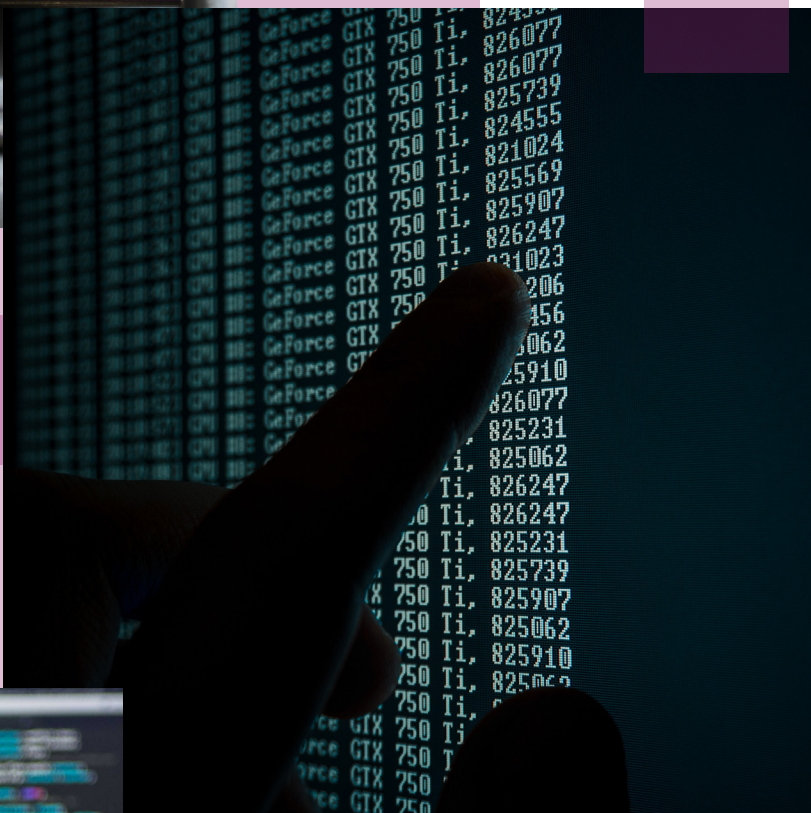
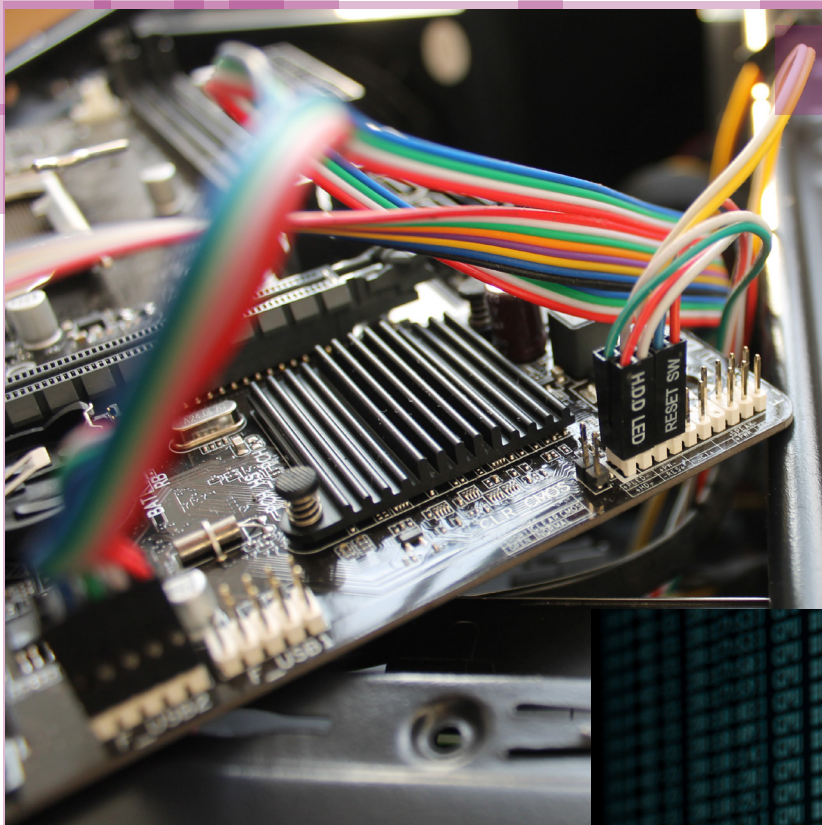
The location has to have a classroom facility and a good IT network such as stable WiFi. There must be enough tables or desks. We have laptops, Ipads and raspberry pi's available for the participants. We use open source applications (for example Linux, Python and Javascript).

When we started the Hacklab, we searched for a location that is easy to reach (for example an office or a school building). Our location is the NDC Multi Media building, because the foundation Cyber Safety Northern Netherlands started working from here.

### Hardware requirements

- A laptop or a desktop with as much RAM and processor power you can arrange.
- A large HDD or SSD to store your tools and other important files.
- A host OS for your computer system. It can be Windows, Linux or Mac OS depending on your choice.
- Latest security patches must be installed on your guest OS before you start.







### 3.2 The Hacklab and Partners

To run a Hacklab, it has to work close in cooperation with other partners. Potential partners of a Hacklab can be:

- > IT companies, specialized in cyber security
- > Large companies with strong affinity to Cyber (for example the finance sector)
- > Governmental departments involved in cyber safety and -security

It is important to create an environment with several partners. These partners have their background in education, government and companies. This extensive network is important for funding of the foundation, internships for the participants of a Hacklab and a knowledgebase (with regard to teaching and guest lessons at a Hacklab). You will need these three stakeholders (educations, government and companies) to form a stable starting position for setting up a Hacklab.

### 3.3 Hacklab employees

A Hacklab needs employees. It is important to employ an operational manager and two coaches. The operational manager is responsible for acquisition, planning, finance, and IT infrastructure. The coaches are responsible for content of the lessons, participant coaching and organising internships.

A coach needs two competences. They need to be knowledgeable in IT and they need to be able to guide special needs students. We have recruited two IT specialist with coaching experience.

#### *Education/experience of the coaches*

The coaches in the Hacklab did specific coaching training. These education is solution - oriented. They also did a positive psychology course.

#### *Method of working*

The coaches of the Hacklab work with positive psychology. The starting point is what is there and work with that. Do not focus on the problems that exist. There is room to talk about the problems, but it is also very important to explain where the talents lie and what makes a participant special.

#### *Administration of the Hacklab*

The coaches of the Hacklab also have administrative tasks. When the participant has an intake, the coaches make an appointment by email. This is for the archive and retrieving information; through which party someone has been referred.

When the intake is positive, the coaches mail to the participant when and where and for which classes he is expected. The participant details need to be registered (name, e-mail, telephone number, contact person, municipality, the location of the Hacklab, whether or not a laptop on loan, public transport card).





### **3.4 Recruiting participants**

A Hacklab can use these four steps for recruiting students.

#### Step 1: Brand awareness

The first step is brand awareness: make yourself known to the target group by social media, the media and special target communication.

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#### *Dutch approach:*

We have made ourselves known to employment agencies and job coaches from the Municipality. In turn, they know how to find us. We use the local newspapers and radio stations to reach the parents and the network of the target group. We meet with the participants through LinkedIn.

#### **Step 2 Signing up personally**

The second step is signing up personally: it is important that the student applies personally. In doing so, they pass an important threshold and they show their motivation.

#### **Step 3 Intake**

The third step is an intake. The job coach interviews the student-to-be to find out if there is a match between the student, coach and Hacklab.

#### **Step 4 Planning**

When the participant has been admitted, the last step is making a plan. The coaches create a route plan with the participant and they keep it up to date. It is important that the student and the coach draw up a plan with goals and that they make a timeline. The student is in charge of their path. On request, this plan can also be discussed with clients who are behind the participation.

#### Criteria used by the Hacklab Northern Netherlands

The students have to have:

- > Strong motivation
- > Big interest in: IT, Cyber, Gaming, etc.
- > Teachability
- > Age bracket 15-25 years (but not strictly if they are very motivated and fit in our philosophy)

#### Coaching the participant

##### *Procedure*

When a participant has been allowed to the Hacklab, the coaches will create a route plan. They keep it up to date during the participant's education period. Participants will have conversations with the coaches. They keep track of which lessons someone is following and what stage someone is in. The coaches will have multiple conversations with the participants of the Hacklab. There is always the intake conversation. At every transition of a participant there is also a conversation.





# How to organize a Hacklab.

## 4.1 Make a Hacklab operational

*To make a Hacklab operational, the most important things you need are:*

- Coaches with knowledge of IT and guiding special needs students
- (Guest) Teachers
- Educational plan and planning
- Teaching aids and location hardware. This includes: computers/laptops, raspberry pi, assignments and internships for the students for practical teaching

*An example of a day program at the Hacklab:*

- 09:45 Start/Walk in
- 10:00 Joint Kickoff
- 10:15 Workshop: Setting up Pentest environment  
--> **Ethical Hacker 'X'**
- 12:00 Lunch
- 13:00 Assignments: work independently and/or in groups on assignments
- 16:00 Closing

*We work with:*

- VirtualBox
- Windows
- Linux
- Raspberry pi
- Arduino
- Kali Linux
- Bash
- Python
- Perl

*Possible subjects:*

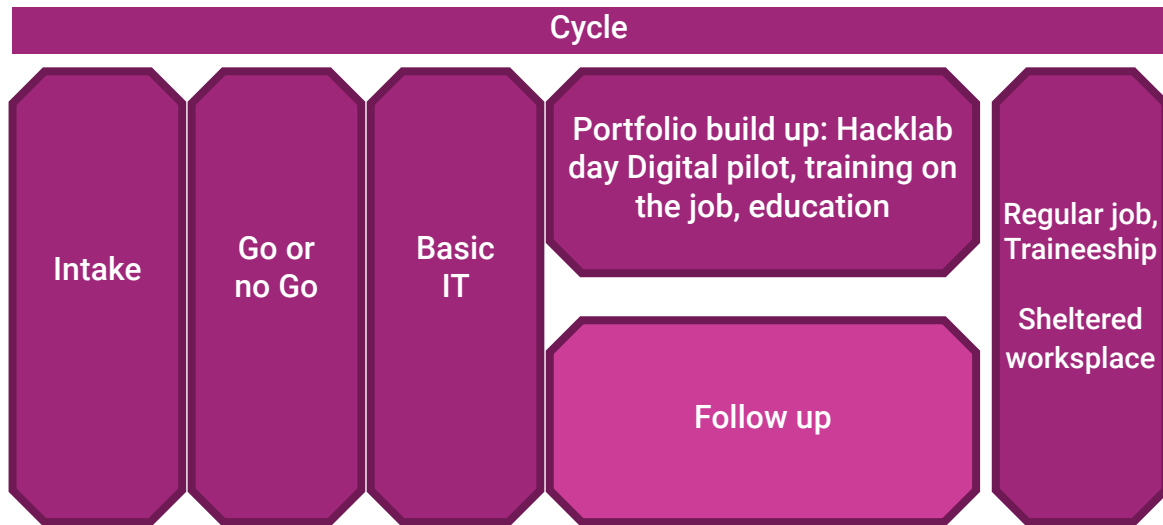
- What is a responsible disclosure?
- How do routers and switches work?
- How does a SSL-handshake work?
- How do I set up my pen test environment?



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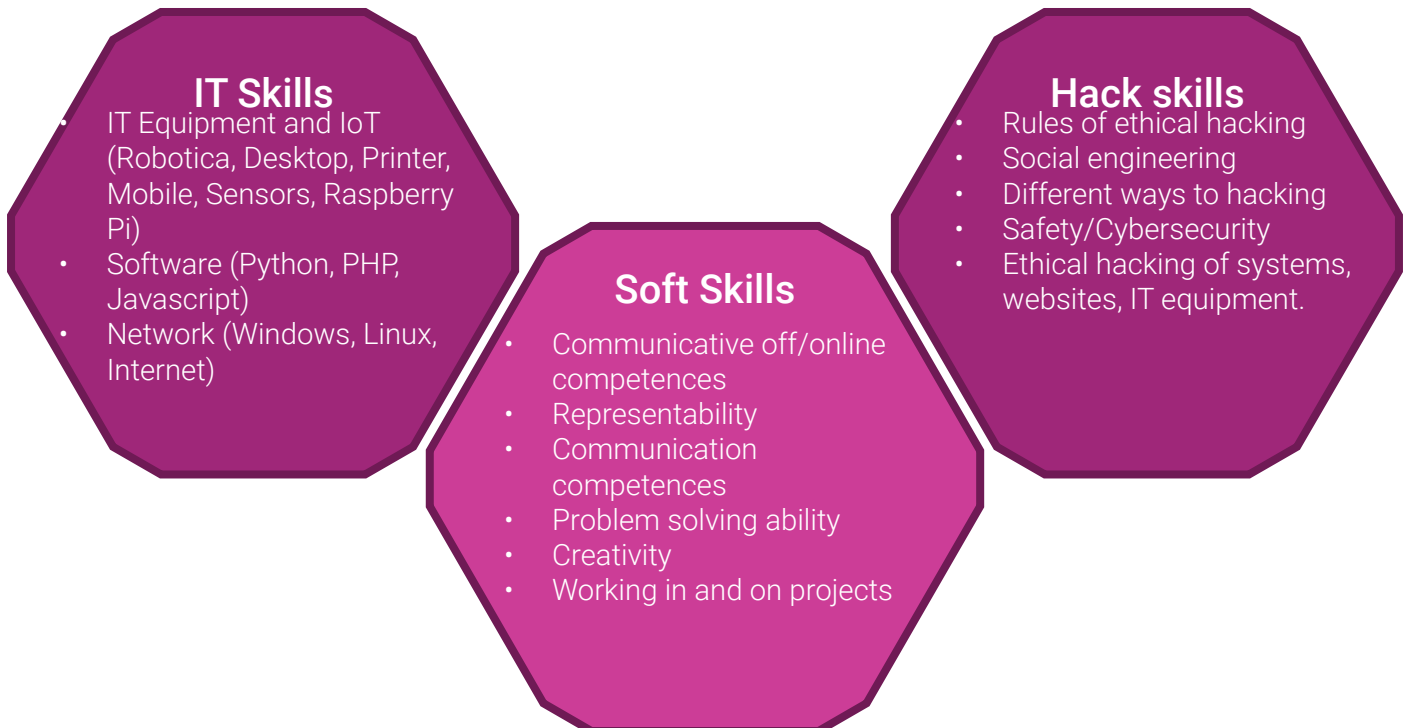


## 4.2 The Hacklab Cycle



In this image you can see an overview of our Hacklab Cycle. For the intake we use our own digital method “*matching the skills*”. This generated report gives us insight into the current knowledge situation of the participant. Most participants start with the training Basic IT. When the participant has completed this training, he will start with building his portfolio of skills. When the participant has expanded his portfolio, he can apply for a regular job, a traineeship or a sheltered workplace.

## 4.3 Training skills



The digital method “*matching the skills*” gives an overview of the progress of individual participants. Therefore, each participant has his own planning. Each participant will work on developing different skills: IT skills, Soft skills and Hard skills.



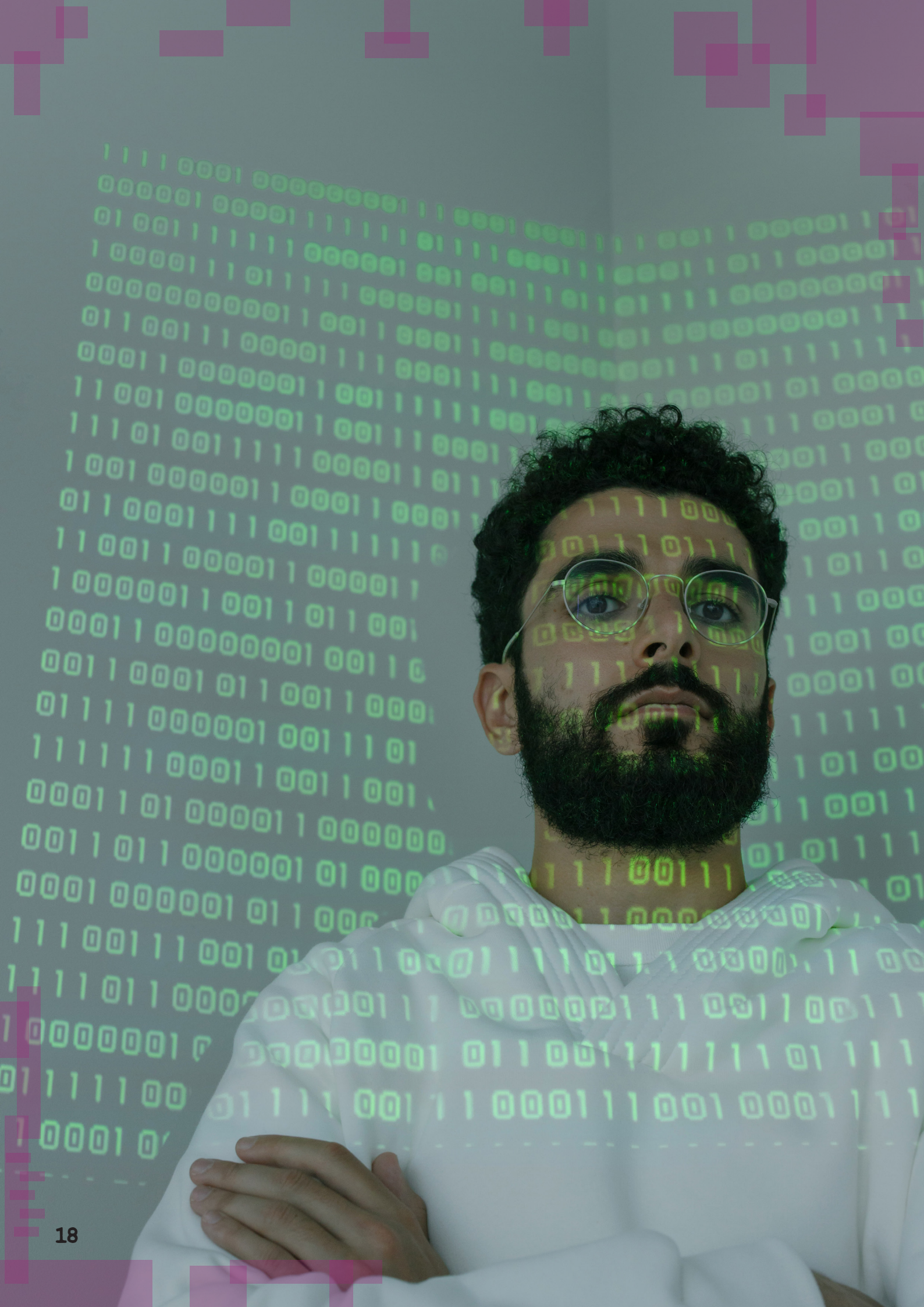


#### 4.4 Planning modules



IT Stack	Discover your talents	Develop your talents	Partners	Certificates
Front-end development	CSS	Agnular JS	Klare Koe	Hacklab
	HTML	React JS	vacature	Hacklab
	Javascript	VueJs	vacature	Hacklab
Back-end development	PHP	Laravel	Scripturo/Linehub?	Hacklab
	C#, C++	.Net	SJ Automatisering	Netacad
	Java	Spring	Lost Lemon	OCA/OCP
Data-analyse	Python/R	Microsoft	vacature	Startel
		SAS	vacature	SAS
Cyber Security	IT Essentials	Pentesten	vacature	Hacklab, CEH, Netacad(Cisco)
	Intro netwerken/ Linux	CCNA (Netwerken)	vacature	Netacad(Cisco)
	Intro Cyber Security Essentials	Linux/ Windows 365	vacature	Microsoft, Netacad(Cisco)

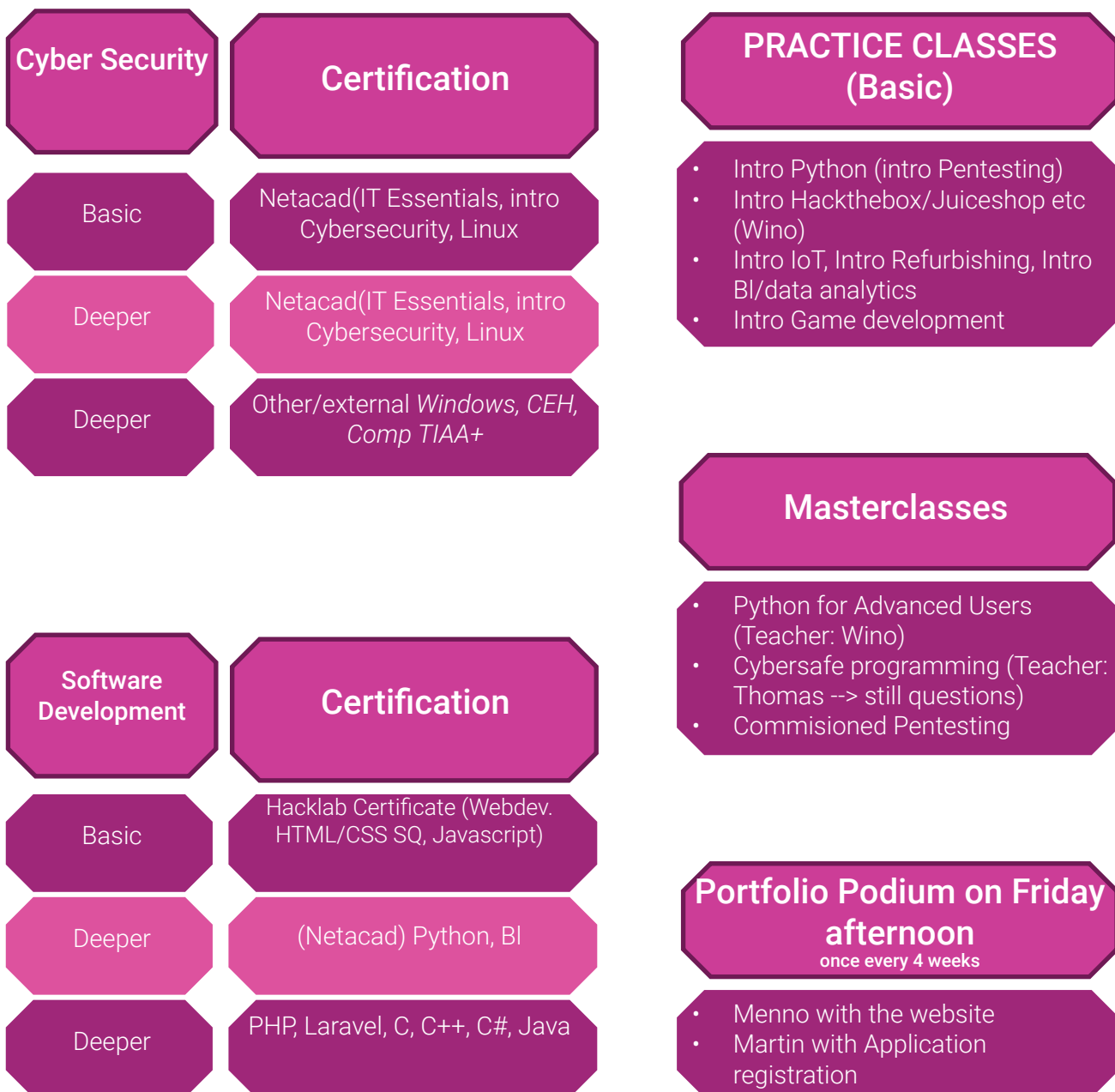
- The course lasts 9 months.
- The development of cyber skills and the discovery of the participant's talents starts immediately.
- The first 4 weeks is the intake period in which it is assessed whether the Hacklab suits the candidate
- Stacks can be changed and in this way the participant can discover what interests him or her most and where his or her greatest talents lie





The course of the participants lasts 9 months. The development of cyber skills and the discovery of the participant's talent starts immediately. The first 4 weeks of the process is the intake period in which it is assessed whether the Hacklab suits the candidate. Stacks can be changed and in this way the participant can discover what interests him the most and where his greatest talents lie.

*The Hacklab education program:*





## 4.5 Work experience for the participants

### 1. Test environment



The test environment is a space where participants work, learn a gain experience working on digital projects, either independently or under guidance.

The projects are:

- Python programming,
- Building websites
- Working with Arduino,
- Game development
- Creating a training  
“an introduction to ethical hacking”

The different projects are aligned to the knowledge level of the participants.

The test environment compares to a real workplace

### 2. Training on the job



Training on the job is becoming increasingly more popular. It gives the participant the possibility to gain experience in a real working environment. The participants are introduced to new tools and techniques.

They also learn about a normal working day

### 3. Projects



A participant builds his own portfolio by working on projects. The projects are real assignments for different customers.

Examples:

- *Building a website.*
- *Pentesting*
- *Developing an application.*
- *Creating a digital game etc.*





# Inspiration

# 5

In this paragraph you can find links to websites with useful information for setting up a Hacklab and useful tools.

General information about a Hacklab and useful tools

<https://www.geeksforgeeks.org/how-to-set-up-a-personal-lab-for-ethical-hacking/?ref=lbp>

<https://www.guru99.com/learn-everything-about-ethical-hacking-tools-and-skills.html>

<https://hacklab.frl/>

Coaching

<https://www.hanzepro.nl/alle-opleidingen/zorg-en-welzijn-opleidingen/sociaalpedagogical-psychological/positive-psychology-course/>

<https://www.cvc.nl/opleiding/leergang-oplossingsgericht-coachen/>



# Example assignment Hacklab



Now follows an example of how the Hacklab starts with an assignment. This assignment is about doing a pen test for a client.

## From the client we need:

- The website
- Permission from the client and the administrator of the website to perform a pen test according to agreements made through the contract
- Time to receive feedback (and give feedback on the result of the pen test so that our participants can learn from it)
- Hacklab is a foundation that depends on subsidies and donations. A gift from the client is appreciated. The amount of the gift may be determined by the client after the pen test result has been delivered.

## Method pen test Hacklab:

- Website is accessed and viewed from the outside (blackbox). Pen testers do not have to be physically on the location
- Duration of the pen test depends on what is found during the test
- The purpose of the test is not to demonstrate that the website can be penetrated. The pen testers will not make an actual attempt to invade the website. The testers will look for vulnerabilities that make a hack possible. These vulnerabilities are being investigated and fixed
- A serious vulnerability and/or calamity will be reported immediately to the client
- Findings are reported in writing and explained orally to the client
- If desired, findings can also be explained to technical specialists or administrators of the website





# Example guest lesson Hacklab

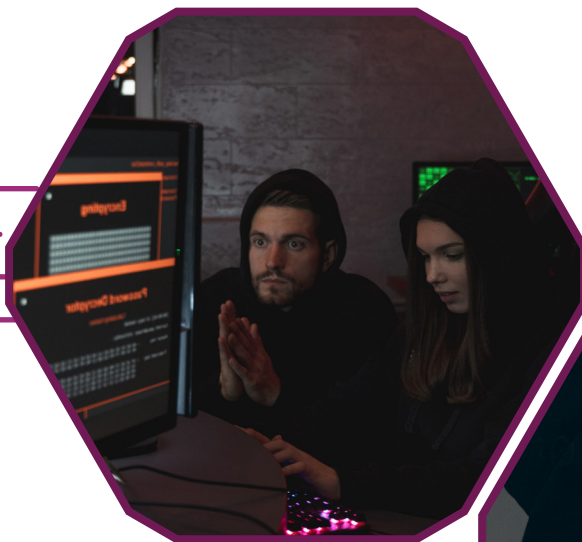
The Hacklab is aimed at practical (IT) skills. In order to learn from practice, it is also useful to invite guest lectures. The guest lessons may therefore also be practical in nature.

1. Introduction guest speaker/teacher: it is always interesting for the Hacklab participants to hear about the career of an IT professional. What steps have been taken and what has the guest teacher been working on? What gives the teacher energy as an IT'er in his daily work?

2. Theory on the subject: the theory of the guest lesson may come from education as well as the daily practice and working methods. The guest teacher can also talk about methods that have been developed in the workplace. Practical examples can supplement this.

Optionally, in the guest lesson, the participants can be provided with an assignment, which they can work on in groups or individually. The results of the assignments can be discussed later in the group.

*Examples of topics:* Ethical hacking in practice; Juiceshop Challenge; Power bi; Practice of Data Science; Introduction to Scrum; Programming with Python; Working with Microsoft Azure.





# Contact details of the Hacklab Northern Netherlands



If you want more information about setting up a Hacklab or if there are further questions, do not hesitate to contact us:

**Address:**

Sixmastraat 15, 8932 PA, Leeuwarden, The Netherlands

**Email address:**

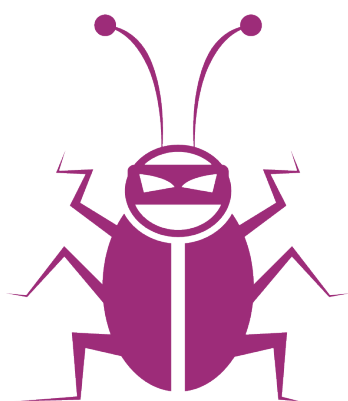
[info@hacklab.frl](mailto:info@hacklab.frl)

**Website:**

<https://hacklab.frl>

**Phone number:**

Erik Miedema (M): 0622372635



# WHAT the HACK?!

Find out more:  
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