Internet of Things project

*Manual*

Study load : 11 ECTS (308 hours)

Date : 2016-08-24

Year : 2016- 2017

Program(s) : HBO-ICT Thematic semester Internet of Things

Program year : 2nd, 3rd or 4th year

Version : 0.9

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# Introduction

This is the student manual for the project of the thematic semester Internet of Things (IoT). During the project you’ll work as part of a project team on one assignment for an external client. All assignments are set within the Internet of Things world. However not one assignment is the same, the technology used can be different for each assignment and even depends on the choices your team makes in collaboration with the external client. This is what makes the IoT project fun and that you will approach problems and solutions with an open mind.

During the project you’ll use knowledge and skills you mastered in other courses of the thematic semester. For example, you’ll be able to use your design skills which you developed in the Creation and Design course. Although all courses within the IoT semester are related, they each follow their own assignments and planning.

In the following chapters you can find all the information regarding the project, like grading, project structure etc. When you can’t find an answer to your question in this manual ask the semester coordinators Bas or Joey (preferably by email: b.pijls@hva.nl, j.h.f.van.der.bie@hva.nl).

Kind regards,

Bas Pijls & Joey van der Bie

# Learning outcomes

The student will be able to:

* Configure an application supporting cooperation;
* Test and report on usability of an application;
* Create a business model;
* Analyze the need for data within a business;
* Analyze and develop an infrastructure to generate and distribute data;
* Implement an infrastructure that is secure and scalable;
* Implement a system that consists of several subsystems;
* Advise about the architecture of software and hardware components within a system.

## Competencies

* Professional Expertise
* Research skills
* Professional Ethics and Social Awareness
* Communication Skills
* Learning skills
* Collaboration Skills.

See Appendix I for a detailed description of the HBO-ICT competencies.

## Professional tasks and skills

Each student will work on different professional tasks and skills. The choice for which of the professional tasks to develop varies based on:

* The assignment
* The skill-level of the student at the start of the project
* The individual learning goals of the student

The project will provide a ground for further development of pre-existing skills or to work on a totally new skillset. Typical professional skills that you can develop in the context of Internet of Things are:

* User Interaction Advice
* User Interaction Design
* User Interaction Implementation
* Infrastructure Design
* Infrastructure Implementation
* Infrastructure Advice
* Software Implementation
* Software Advice
* Hardware Implementation
* Hardware Advice
* Hardware Design
* Business Processes Implementation
* Business Processes Analysis
* Business Processes Design
* Business Processes Advice

See Appendix II for a detailed description of the HBO-ICT Professional Skills.

# Programme

## Content

Teams will perform their assignment independently. Each week a day is scheduled for teams to work on their assignment. During this day, the consultants can also organize workshops, guest lectures, progress reviews, code reviews etc. The contents of the project day will depend on the teams’ necessity.

### Team organization

In the IoT project you work in teams of 5 or 6 students. Teams are purposefully composed of students from different backgrounds to mimic a real world scenario, where professionals of different disciplines have to work together.

The specializations that we recognize in this project are:

* Technical Computing
* Software Engineering
* System and Network Engineering
* Game Development
* Business Information and Management
* Communication and Multimedia Design
* Exchange students will be admitted if their transcript matches any or a combination of the previously mentioned disciplines

Each team has on average two working days (16 hours) per week to work on the project. Eight hours are scheduled in the calendar with an available working location, the other eight hours, teams have to schedule independent. However, it is expected of the teams that they work together in collaboration at the school facilities.

### Assignment

During the project you’ll work as part of a project team on one assignment for an external client. All assignments are set within the context of the Internet of Things. However not one assignment is the same, the technology used can be different for each assignment and even depends on the choices your team makes in collaboration with the external client. This is what makes the IoT project fun and that you approach problems and solutions with an open mind.

### Coaching and Consultancy

Each team has a consultant and a coach.

With the coach the team can discuss the team collaboration, learning goals, and overall progress. Every two weeks the team has a meeting with the coach. The meetings are mandatory for all members of the team.

The consultant can help solving issues and advise on the technical approach. Every two weeks the team has a meeting with the consultant.

## Methods

Each team logs its progress. The progress is biweekly evaluated with the coach and consultant in separate meetings. Teams are free in choosing their format, but it is highly recommended to use the scrolls of the Creating and Design course.

## Study materials

As primary information source the Virtual Learning environment (VLO) will be used. For successful completion of the project assignment each team has to collect and find the needed information using external reliable sources available on platforms like the library, Google Scholar, etc.

## Project Evaluations

Your work on the project will be evaluated during the semester on several different occasions. Summative (graded) evaluations will take place at the end of the project. At least one formative (non-graded) evaluation will take place at the end of the second period, in the midterm review. During the semester your work will be evaluated by the coaches and the consultants, in order to provide feedback and give the teams the chance to improve their work.

## Teachers and availability

Technical consultants:

Joey van der Bie [j.h.f.van.der.bie@hva.nl](mailto:j.h.f.van.der.bie@hva.nl)

Bas Pijls [b.pijls@hva.nl](mailto:b.pijls@hva.nl)

Coaches:

Bert Pinkster [b.pinkster@hva.nl](mailto:b.pinkster@hva.nl)

Nora Kouwenhoven [n.kouwenhoven@hva.nl](mailto:n.kouwenhoven@hva.nl)

## Planning

Each week, one day is scheduled for project activities. If no specific activities are planned for a certain week, you can expect a teacher to be present in the scheduled room.



# Examination

## Examination components

In the final weeks of the project, three assessments will take place. The outcome of these three assessments will determine the final grade of the project.

### The product presentation and demonstration

Your team will demonstrate and present the project in two separate events:

* Presentation: You will present the project to a panel consisting of coaches, consultants and stakeholders of the project.
* Demonstration: You will present the product to the external stakeholders during a poster session

**Retry**

When the quality of the product is deemed insufficient, all teams will be granted an extra chance to show improvements to the final product and present their final version before the end of following period. For semester 1, this will be before the end of period 3 and for semester 2, this will be at the end of the summer holiday.

### The process assessment

During the process assessment you will be evaluated for your development of the following competencies:

* Communication
* Cooperation
* Professional Ethics and Social Awareness
* Learning ability

For each of these competencies you will be required to produce a STARR form and further evidence that proves that you have worked to develop said competencies. You will present the collected evidence during an oral assessment.

See appendix III for an example of a STARR form.

**Retry**

When the provided evidence is deemed insufficient, all students will be granted an extra chance to collect further evidence to prove their growth in the competencies: communication, cooperation, professional ethics and learning ability. The deadline for the retry will be before the end of period 3 for semester 1 and at the end of the summer holiday for semester 2.

### The individual assessment

At the end of the project you are required to provide evidence for the quality and quantity of your individual contributions to your project. You will do this based on a set of predefined "Professional Tasks" such as defined in appendix II. These tasks are based on the national standard for IT students, defined by the HBO-I foundation ([www.hbo-i.nl](https://www.google.com/url?q=http://www.hbo-i.nl&sa=D&ust=1486380942021000&usg=AFQjCNFK00pKSR8rzkVlWigSV4vHuG-Gcw))

You can choose to divide your contribution in the following ways:  
\* 2 tasks at level 3  
\* 3 tasks at level 2  
\* 3 tasks at level 1 and 1 task at level 3  
\* 1 task at level 1, 1 task at level 2 and 1 task at level 3

For each tasks you will have to show us your work in the form of a product. This can be anything, ranging from a stakeholder analysis to a research document to a piece of code.

At the end of the project you will submit your work for each of the chosen professional tasks. The professional task portfolio and the process portfolio will be assessed at the end of the project.

**Retry**

When the provided evidence is deemed insufficient, all students will be granted an extra chance to collect further evidence to prove their growth in their professional expertise, their research skills and/or the professional skills. The deadline for the retry will be before the end of period 3 for semester 1 and at the end of the summer holiday for semester 2.

## Products

The products that you will deliver will match your assignment and your ambitions as a team and as an individual. Aside from the components that make up the final product, most teams are at least required to deliver the following products:

* Business case
* Requirements analysis
* Design document
* System overview

During the project several deliverables are expected:

* Midterm report
* Pitch
* Prototype
* End report
* End product

## Grading

The evaluation of your product will be done by your client and the consultants. The final group-product will be graded on complexity, communication and usefulness for the product owner. The student will show his/her contribution to the project by collecting evidence that shows proficiency in the HBO-I professional tasks during an individual assessment. The student will show his/her progress in selected competences in a process assessment.

## Changing a grade

After the publication of the grade in SIS a student has 25 workdays (as stated in OER, article 5.13 lid 3) to file a formal complaint at the teacher. After this deadline the grade is permanent and can only be changed by a retake of the exam.

## Procedure dismissal from project

When working on projects, collaboration plays a crucial role. What do you do if a team member fails to live up to agreements, not doing his job, arrives too late? Of course you can ignore such behavior. It means that other team members have to do extra work. Even more important, it shows that other team members are not 'professional' enough to question unacceptable behavior. Teams acting this way will not score very high in regards to their process during the project. Is it then useful to remove a non-functioning member from the team immediately? Of course that's not the best solution. After all, everyone is entitled to a second chance.

The coaches in Project Internet of Things apply the following procedure:

1. When a team member fails to live up to agreements, the team talks about it as soon as possible. Feedback is given and the team asks the team member to change his or her behavior.
2. When the team member fails to live up to agreements again, the team leader (or another team member) contacts the coach about the issue. The coach organizes a crisis meeting with the non-functioning team member(s) and the other members of the team. So the coach is always present at a crisis meeting.
3. During the crisis meeting, the functioning of the group and that of individual members will be discussed. At the end of this crisis meeting, (new) rules will be defined and the team agrees upon a period during which the non-functioning team member must prove that he can function properly within the team. The rules and period agreed upon during the crisis meeting will be recorded in writing and send by email to the coach.
4. At the end of the period, a new meeting between the team and the coach will take place. If, according to the team and the coach, insufficient or no progress is shown, the member is dismissed. In this case the team continues the project with fewer members. If necessary, a change in the project deliverables can be agreed upon with the representative of the client.
5. A student that is dismissed from the group has the responsibility to propose an alternate assignment with a new company to the project coordinator. After agreement of the project coordinator the student can start at this new assignment.

# Appendix I HBO-ICT Competencies

Professional Expertise

|  |  |
| --- | --- |
| Description | You have the knowledge and skills that are important to an IT professional. You understand the relevance and value of your expertise. You apply this expertise in your professional practice.  You work methodically, you set criteria for products in advance and you follow professional IT standards. |
| Examples of competent behavior: | |
| Applies (scientific) knowledge | ·         makes a well-founded choice when applying theories, methods and  techniques  ·         applies knowledge and insight correctly |
| Delivers quality results | ·         sets criteria for a product in advance  ·         checks if a result meets the criteria  ·         works accurately  ·         follows professional IT standards |

Research Skills

|  |  |
| --- | --- |
| Description: | You are able to find creative solutions to problems. |
| Examples of competent behavior: | |
| Creativity | ·         generates ideas  ·         comes up with new and original solutions  ·         views issues from less obvious perspectives |

Communication Skills

|  |  |
| --- | --- |
| Description: | You make transparent appointments and you always check if expectations are met. |
| Examples of competent behavior: | |
| Is client-oriented | ·         focusses on requirements set by the customer  ·         checks if customer expectations have been met  ·         addresses customer wishes/complaints timely and correctly |

Team Collaboration

|  |  |
| --- | --- |
| Description: | You are able to produce results efficiently and effectively, in collaboration with both colleagues and clients. You can manage a project team, motivate team members and contribute to team spirit. |
| Examples of competent behavior: | |
| Task-oriented collaboration | ·       effectively contributes towards a common outcome  ·         has a clear overview of who needs to do what and when  ·         delivers what is promised / agreed on  ·         looks critically at his/her own contributions and asks for advice when needed |
| Team-oriented collaboration | ·         contributes to team spirit  ·         involves team members in discussions and decision-taking, asks for their opinion  ·         supports team members, offers (requested) help  ·         is open to feedback and suggestions  ·         addresses conflict whenever needed in an open and positive way |

Learning Ability

|  |  |
| --- | --- |
| Description: | You have the capacity to reflect on your own actions and to pinpoint your strong and weak points. You are open to different perspectives and feedback. You manage your own development as an IT professional. |
| Examples of competent behavior: | |
| Reflection | ·         reflects on his/her own actions and results  ·         asks for feedback from other people  ·         pinpoints his/her own weaknesses and strengths  ·         is open to different visions and methods,  is able to let go of personal ideas |
| Self-management | ·         changes behavior if needed based on feedback and self-reflection  ·         sets learning goals and takes action to reach them |

# Appendix II HBO-ICT Professional Tasks

### Business Processes

|  |  |  |
| --- | --- | --- |
| **Task** | **Level** | **Description** |
| Manage | 3 | Layout and update principles, business rules and process-architecture models, partly based on quantitative and qualitative analysis. |
| Proactively identify the need for change and activate corresponding processes. |
| 2 | Layout, maintain and update functional management. |
| Identify and catalogue the need for process changes, partly based on data from quantitative and qualitative analysis. |
| 1 | Maintain and update process documentation. |
| Describe the need for modifications during a process, based on data from quantitative and qualitative analysis. |
| Analyze | 3 | Identify the consequences of a (strategic) reorientation in business processes and related information provision. |
| Perform a quantitative and qualitative analysis of the current and future situation in areas such as policy, strategy, alignment and architecture, using conventional methods. |
| 2 | Analyze business processes, organization, data flows, data requirements and process control (at tactical/operational level), and describe bottlenecks and cause- effect relationships from the perspective of information provision. |
| 1 | Record the data flows and information provision of a business process. |
| Analyze the bottlenecks within a business process and describe cause-effect relationships. |
| Advise | 3 | Advise on the internal and external attunement between business and ICT (alignment and governance), based on the (network) organizational strategy and objectives. |
| 2 | Advise on bottlenecks in the field of organization structure (and roles), of the structure and coherence in business processes, and of informative provision |
| Advise on new possibilities/ opportunities for the organisation based on ICT developments. |
| 1 | Formulate improvements regarding organization (structure), (business) process structure and/ or information provision, based on bottlenecks analyzed within a business process whilst taking ICT facilities into account. |
| Advise on the applicability of an ICT development for a specific organisation. |
| Design | 3 | (Re) design the architecture of business processes and control models, including related management, information provision and process of change. |
| 2 | (Re) design related business processes, a data structure (model), the process management of business processes, the functional organisation structure and/or the information provision, taking into account all ICT facilities and data integrity assurance. |
| 1 | (Re) design and/or digitize a business process, various data flows, an organisation unit and/or part of the information provision. |
| Implement | 3 | Implement the introduction and acceptance of revised business management, based on a process of change. |
| 2 | Implement the introduction and acceptance of procedures in conjunction with new or revised information provision and control. |
| 1 | Describe and draft job instructions, job and role descriptions, and procedures for an (adapted) process. |

### User Interaction

|  |  |  |
| --- | --- | --- |
| Manage | 3 | As soon as a product or service development is initiated, always take into account product accounting, product context, continuity and transfer to the client and/or user environment. |
| 2 | Apply version management and layout and configure a collaboration environment through the implementation of ICT and/or digital media products, taking into account maintainability and available resources. |
| 1 | Layout and maintain a personal working environment for analysis, design and implementation of ICT and/or digital media products, using a standard tool. |
| Transfer an outlined version of the finished product, including product accounting, to the client. |
| Analyze | 3 | Identify communication trends and developments in design repertoire regarding ICT and/or digital media products. |
| Draw up an analysis report (target group, goal, context, information and communication requirements, visualization, usability and usage); relate this to ICT and/or digital media products trends. |
| 2 | Analyze ICT and/or digital media products, target groups and goals, based on an overview of current culture and developments concerning the inventory of customer and user needs. |
| Analyze interface, usage and communication, including usability and user experience. |
| 1 | Catalogue the design repertoire (shape, color, stylistic features) and describe the brand or product identity of a current ICT and/or digital media product. |
| Identify target groups and objectives and link these to user behavior and interaction. |
| Advise | 3 | Draw up an advice, covering social trends and branch trends, on the actual deployment of media and resources concerning the development of ICT and/or digital media products – taking into account planning and budgeting. |
| 2 | Advise on the actual deployment of media and resources, taking into account (communication) objectives, target groups, planning and budgeting. |
| 1 | Advise on the means of interaction, communication and visualization concerning deployment during communication and interface development. |
| Make recommendations for the design of an ICT and/or digital media product, based on a given usability analysis. |
| Design | 3 | Design an ICT and/or digital media product, based on a personally designed (innovative) functionality, interactivity, style and/or service, including user experience, usability tests and innovative technology. |
| 2 | Design a coherent and dynamic ICT and/or digital media product, applying partly self-selected techniques, such as scripts, storyboards, navigation structure and matching usability tests. |
| 1 | Design a static and dynamically limited ICT and/or digital media product, applying given techniques, such as scenarios, storyboards and wire frames, and matching usability tests. |
| Implement | 3 | Implement and test dynamic ICT and/or digital media products, applying innovative technologies. |
| 2 | Implement and test dynamic ICT and/or digital media products, applying relevant graphical elements, sound, vision and animations. |
| 1 | Implement and test static ICT and/or digital media products, using standard tools, a range of suitable (media) formats, and a limited usage of stylistic devices. |

### Software

|  |  |  |
| --- | --- | --- |
| Manage | 3 | Implement configuration, change and release management. |
| 2 | Layout, manage and use a software factory to support software development within teams. |
| Apply principles to manage and monitor a software development process. |
| 1 | Layout and use a management system to support software development within a team setting. |
| Analyse | 3 | Carry out a requirement analysis for a software system with various stakeholders, in the context of existing systems. |
| Identify integration and migration issues. |
| Define acceptance criteria on the basis of quality characteristics and a performed risk analysis. |
| 2 | Carry out a requirement analysis for a software system with various stakeholders, taking into account the quality characteristics. |
| Perform an analysis to formulate and validate functionality, design, interfaces and the like, of an existing system or component. |
| Set up an acceptance test on the basis of quality characteristics. |
| 1 | Collect and validate functional requirements for a software system with one stakeholder and according to a standard method. |
| Define acceptance criteria for the above-mentioned functional requirements. |
| Advise | 3 | Advise on the choice of software architecture or software frameworks, in which cost and quality aspects such as availability, performance, security and scalability play a part. |
| Advise on the layout of a software development process, including the test process. |
| 2 | Advise on possible purchases and subsequent selection of existing software or components when developing software systems in which the cost aspect features. |
| Advise on an architecture component of a limited software system. |
| Advise on the use of prototypes when validating requirements. |
| 1 | Provide recommendations regarding specific requirements of a software system, on the basis of research into existing, similar systems. |
| Design | 3 | Set up a software architecture for a software system, consisting of both existing and new systems, taking into account both quality aspects and stakeholders. |
| Draw up a test strategy for system tests. |
| 2 | Set up a functional design for a software system, taking into account the existing components and libraries, and using quality criteria of design. |
| Determine the quality of the design, for example by testing or prototyping, taking into account the formulated quality characteristics. |
| Draw up test designs according to a predetermined test strategy. |
| 1 | Design a software system with modelling techniques using a standard method. |
| Implement | 3 | Build and make available a software system in line with existing systems and on the basis of the designed architecture, using existing frameworks. |
| Using test automation when performing tests. |
| 2 | Build and make available a software system consisting of multiple subsystems, and using existing components. |
| Integrate software components within an existing system, whilst monitoring the integrity and system performance. Perform regression tests. |
| Perform and report on unit, integration and system tests. |
| Set up an acceptance test for a computer system. |
| 1 | Build and test an elementary software system and make it available. |

### Hardware Interfacing

|  |  |  |
| --- | --- | --- |
| **Task** | **Level** | **Description** |
| Manage | 3 | Set up a development and test platform for hardware/software (HW/SW) co-design, including tools like virtualization. |
| Establish a management test environment for a computer system. |
| 2 | Set up a (cross platform) development environment including tools, both software and hard- ware related. |
| Assess a given development environment for quality and performance. |
| 1 | Set up and use a control environment to support the development of a computer system, e.g. an embedded or IA system, within a team. |
| Analyse | 3 | Specify a distributed computer system, including timing, resource utilization and performance. |
| Describe security aspects of computer systems linked to or through (public) networks. |
| Set up an acceptance test plan and an integration test plan |
| 2 | Identify aspects of monitoring and control within a computer system environment. |
| Methodically specify a computer system. |
| Perform a protocol analysis. |
| Set up an acceptance test for a computer system. |
| 1 | Describe the architecture of a computer system. |
| Describe de operation of actuators and sensors, and perform measurements. |
| Draw up functional and nonfunctional requirements for a computer system, e.g. an embedded or IA system, and establish acceptance criteria. |
| Advise | 3 | Offer a technical advice on a deliverable (distributed) computer system, including hardware and software components and interfaces. |
| 2 | Offer a technical advice on the architecture of a computer system, including hardware and software components. |
| Offer advice on linking systems. |
| 1 | Verify and substantiate a specific technical advice. |
| Verify and describe an initial architecture, and the functionality of a specific system configuration (microprocessor, memory or other building blocks). |
| Design | 3 | Design a distributed computer system, including the assignment of actuators, sensors, timing, resource utilization and performance. |
| 2 | Methodically design a computer system, based on self-selected hardware components. |
| Set up a driver design. |
| Design a protocol. |
| 1 | Design an elementary computer system, e.g. an embedded or IA system, based on specific hardware |
| Implement | 3 | Implement a complete computer system, including network, hardware and system software. |
| Set up and implement an acceptance procedure, e.g. in a virtual environment, including such aspects as timing, resource utilization and performance. |
| 2 | Layout an elementary computer system and establish the interfaces with hard- ware components through software. |
| Write and test driver software. |
| Implement and test a protocol. |
| 1 | Write software for an elementary predetermined computer system, equipped with actuators and sensors. |

### Infrastructure

|  |  |  |
| --- | --- | --- |
| **Task** | **Level** | **Description** |
| Manage | 3 | Horizontal synchronization of ICT management (suppliers, third-party) and vertical synchronization (alignment). |
| Set up and implement a cloud-based public or private infrastructure. |
| 2 | To incorporate management of new technological developments into the infrastructure, including user devices. |
| Implement management processes. |
| Set up a control environment to ensure ICT services quality audits, including receiving and responding to client requests, and to produce service level reports. |
| 1 | Create and document an authentication and authorization structure, and both system and network configurations aimed at a local infrastructure. |
| Document standard management processes and standard operating procedures for the purpose of infra- structure management. |
| Analyze | 3 | Conduct trend research in the field of ICT infrastructure, based on (international) technological, economic and social developments and innovations. |
| Execute a company infrastructure requirements analysis in order to identify functional and non-functional requirements. |
| 2 | Analyze the quality of the infrastructure environment and services, on the basis of standard models and methods. |
| Analyze infrastructure related incidents, problems and security threats. |
| 1 | Analyze an infrastructure according to a standard method and on the basis of predetermined functional requirements. |
| Advise | 3 | Provide advice on infrastructure, including management and security, with reference to information architecture, ICT governance, innovation, and social and international developments. |
| 2 | Advise on the infrastructure layout and management, providing informed choices based on functional and non-functional requirements, on available technology, and on management models and methods. |
| Propose measures for the benefit of information security within the infrastructure. |
| 1 | Provide recommendations on setting up a local infrastructure. |
| Design | 3 | Design a cloud-based infrastructure in compliance with all requirements. |
| Design an incident response organisation and procedure, so as to be able to respond adequately to incidents of any nature and scope. |
| 2 | Describe management processes and agreements concerning the delivery of services. |
| Set up a functional design aimed at automating infrastructure management in a specific business environment. |
| Set up a technical design for the use of an infrastructure, including related security measures based on functional and non-functional requirements. |
| 1 | Draw up specifications for a local infrastructure according to a standard method. |
| Implement | 3 | Implement public or private cloud-based infrastructure and services, in compliance with all requirements. |
| Set up an integrated multilevel ICT environment in order to implement central monitoring of the quality and security of ICT services. |
| 2 | Layout an infrastructure which meets the requirements in the areas of performance, usability, security and compliance. |
| Establish basic monitoring of the infrastructure. |
| Prepare and implement a test plan for an infrastructure quality test on the basis of a developed functional and non-functional design. |
| 1 | Layout and test a local infrastructure and make it available. |

# Appendix III STARR Form

**The presented evidence:**

0 a product that I have made myself, namely: ……

0 a product I have made in collaboration with others, namely: ......

0 a description of an actual experience

**The evidence will have relation to the following competencies:**

…… (for example: “Professional Expertise” or “Professional Ethics”)

**Date of evidence: ……**

**Illustrate the evidence by answering all the questions below. Add this STARR form to the evidence that it describes and submit this digitally to the assessors.**

|  |  |
| --- | --- |
| ***S*** | **Situation:**   * Describe the occasion and the goal of the assignment/task from which the evidence came to be. * Mention all stakeholders that were involved |
|  |  |
| ***T*** | **Task:**   * Describe the exact task that you were responsible for and your role in fulfilling the task * Describe whether you performed the task yourself or whether you had support from others |
|  |  |
| **A** | **Activities:**   * Describe your approach: which activities, in what order, what preparation was necessary, what methods , models, etc. did you employ? Substantiate your choices and use sources when applicable. * In the case you have collaborated with others, make clear which activities were in collaboration and which activities you were solely responsible for. |
|  |  |
| **R** | **Result:**   * Describe the result of your assignment and your approach. * How is the result evaluated, by whom and what criteria were used? * If the result is a tangible product, is it similar to what you have learned during your education? * If not, explain why you have diverted from the approach you have previously learned. What decisions did you take? |
|  |  |
| ***R*** | **Reflection:**   * Explain why you have chosen to provide this evidence to prove this/these specific competencies. Provide a link between the complexity of the assignment and/or the way the result was evaluated. * What would you do differently when you receive a comparable assignment? Why? |
|  |  |