CLIL Module Plan

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School	ITT Buonarro	oti Pozzo Trento							
School Grade	O Primary	O Primary		O Middle			jh		
School Year	01	O 2	⊚ 3		0 4		0 5		
Subject	Informatica	Topic	-			computational model and Turing machine, two-dimensional array, computer lab			
CLIL Language	English				O Deutsch				

Personal and social-cultural preconditions of all people involved

The ITT Buonarroti-Pozzo is a technical-technological institute with many different specializations that students choose in the third year. The 3INA class consist of 21 boys specializing in information technology. The social-cultural backgrounds is varied but the level of computer science knowledge is quite homogeneous, there are just few cases with ratings below the average. Most of the student are motivated enough to study the IT, but many of them show some concern about their English skills. The main fear is not understanding the subjects and therefore failing the test. Teacher: • Main Teacher (B2). • Previous CLIL experience: CLIL physics, system and networking and web languages (Liceo "Galileo Galilei"). Student group profile: • Average CEFR Level: A1, B1. A very small part of them has foreign origins and speaks a second language that is not English. • Previous CLIL experience with the same teacher: None. • Previous CLIL experience with other teachers: Mathematics. • Special Educational Needs: Three of them have BES certification so their special needs must be taken into account during the tests and to develop teaching and learning strategies.

Students'	prio
knowledg	e,
skills,	
competen	cies

Subject

 Main concept of Object-Oriented programming.
 Basic concept of structured and procedural programming.

Language

Students should have the following knowledge and skills: • Passive forms and simple past • Some conditional forms • IT vocabulary • Use the modal verbs (must, need..) • listen to a teacher's lesson and understanding the general meaning of contents • read meaningful material such as short text and understanding the general meaning • speak with teacher or other classmates, in pairs or in small groups, • ask for help and clarifications when it is necessary • deduce the main information given a written text or a video Competencies know how English language works at intermediate level • interact with a sufficient fluency • express simple thoughts in writing.

Timetable fit

Module

Length 20

Description of teaching and learning strategies

The lessons are mixture of frontal and student-centered lesson. Slides presentation is a necessary tool for children with special needs and it is helpful for the other student to support listening. The lesson took place as a sort of flipped classroom in real time and cooperative learning. Student feedback is strongly encouraged and actual learning is verified having students do simple exercises during the lesson. Sometimes students were asked to work together as a team and carry out small projects in order to promote cooperative learning. Learning tools: computer, projector, Internet, LIM, text, blackboard, slide All the materials is shared with the students by Edmodo (a communication, collaboration, and coaching platform). Materials to support content and language scaffolding slides presentation, exercises, on line simulator, videos.

Overall Module Plan

Unit: 1

Computational model and Turing machine

Unit length: 7

Lesson 1

Algorithm and its properties

Lesson 2

Computational Model and programming language

Lesson 3

Turing machine

Lesson 4

Turing machine simulator

Unit: 2

Two-Dimensional array

Unit length: 5

Lesson 1

Introduction to Two-dimensional array

Lesson 2

Two-dimensional array: size and how to access

Lesson 3

Two-dimensional array: basic algorithm part 1

Lesson 4

Two-dimensional array: basic algorithm part 2

Unit: 3

computer lab: object-oriented programming

Unit length: 8

Lesson 1

computer lab: object-oriented programming part 1

Lesson 2

computer lab: object-oriented programming part 2

Lesson 3

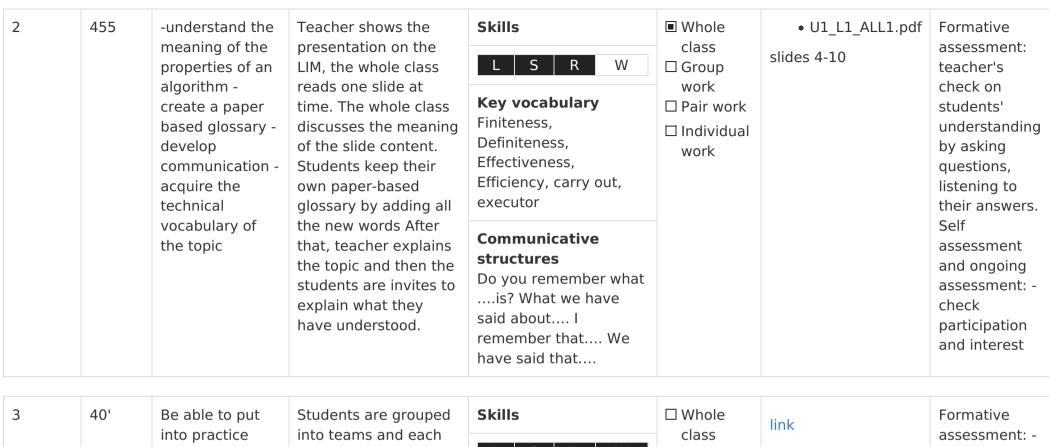
computer lab: object-oriented programming part 3

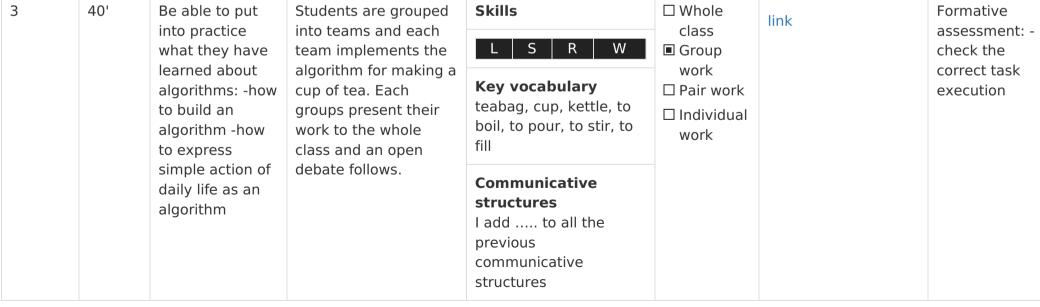
Lesson 4

computer lab: object-oriented programming: test

Unit number 1 Lesson number 1 Title Algorithm and its properties

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	1 15'	-Understand what an algorithm is - create a paper based glossary - Develop communication - Acquire the technical	Teacher shows the presentation on the LIM, the whole class reads one slide at time. The whole class discusses the meaning of the slide content. Students keep their own paper-based	Skills L S R W Key vocabulary algorithm, implementation, method, solve problems, procedure.	■ Whole class □ Group work □ Pair work □ Individual work	• U1_L1_ALL1.pdf Slides 1-3	Formative assessment: teacher's check on students' understanding by asking questions, listening to
		technical vocabulary of the topic	glossary by adding all the new words After that, teacher explains the topic and then the students are invites to explain what they have understood.	Communicative structures Describe Explain how to According to What do you think about? Explain what is			their answers. Self assessment and ongoing assessment: - check participation and interest





Unit number 1 Lesson number 2 Title Computational Model and programming language

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	20'	-Understand what computation means -Understand a simple definition of "computational model" -create a paper based glossary -Develop communication - Acquire the technical vocabulary of the topic	Teacher shows the presentation on the LIM, the whole class reads one slide at time. The whole class discusses the meaning of the slide content. Students keep their own paperbased glossary by adding all the new words After that, teacher explains the topic and then the students are invites to explain what they have understood.	Key vocabulary computation, computational model, behavior, input, output, implicit and explicit form, to provide Communicative structures all the previous communicative structures	■ Whole class □ Group work □ Pair work □ Individual work	• U1_L1_ALL1.pdf slides 11-13	Formative assessment: teacher's check on students' understanding by asking questions, listening to their answers. Self assessment and ongoing assessment: - check participation and interest

2 30 -Understand the the Teacher shows **Skills** Whole • U1_L1 ALL1.pdf Formative relationship the presentation class assessment: slides 14-16 S R W between on the LIM, the ☐ Group teacher's computational whole class reads work check on **Key vocabulary** model and one slide at time. □ Pair work students' computational algorithm. -The whole class understanding ☐ Individual complexity, discusses the Understand that by asking work performances, there are several meaning of the questions, implementation, slide content. types of listening to seguential model Students keep computational their answers. functional model Self models -create a their own paperpaper based based glossary by assessment Communicative glossary -Develop adding all the new and ongoing structures communication words After that assessment: all the previous Acquire the teacher explains check communicative technical the topic and then participation structures vocabulary of the the students are and interest topic invites to explain what they have understood.

3 50' -Understand the The teacher shows Skills Whole • U1 L1 ALL1.pdf Formative relationship the presentation class assessment: slides 16-20 S R W between on the LIM. the ☐ Group teacher's computational whole class reads work check on **Key vocabulary** model and slide by slide the □ Pair work students' mperative, functional, programming presentation. The understanding ☐ Individual procedural, recursive. languages whole class by asking work objected oriented, Understand what discusses the questions, evaluation, executor, meaning of the imperative and listening to instances, structures, functional slide content. their answers. flow control, Student keep their Self programming are manipulation unit, Understand the own paper-based assessment resolution method, glossary by adding and ongoing differences between focus. all the new words imperative and assessment: functional After that the T. check Communicative programming explains the topic participation structures and then the and interest create a paper all the previous students are based glossary communicative Develop invites to explain structures communication what they have understood Acquire the technical vocabulary of the topic

 Unit number
 1
 Lesson number
 3
 Title
 Turing machine

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	20'	Alan Turing life and his main activities: understand what is the enigma encryption machine -Listen and understand a simple video with English subtitles - create a paper based glossary - Develop communication - Acquire the technical vocabulary of the topic	The teacher tells the story of Alan Turing's life and his main activities. Viewing of video about the enigma encryption machine. Open discussion after videos. Students keep their own paper-based glossary by adding all the new words	Key vocabulary encryption, random shift, configuration, operation, predictable, repeatable, sequence, cycle, odometer, rotors, wirings, electrical path Communicative structures all the previous communicative structures	■ Whole class □ Group work □ Pair work □ Individual work	• U1_L1_ALL1.pdf slides 22 link	Formative assessment: teacher's check on students' understanding by asking questions, listening to their answers. Self assessment and ongoing assessment: - check participation and interest

2 45' Understand what The teacher shows Skills Whole • U1 L1 ALL1.pdf Formative is Turing machine the presentation on class assessment: Slides 33-45 S R W and how does it the LIM, the whole ☐ Group teacher's work -create a class reads slide by work check on **Key vocabulary** paper based slide the ☐ Pair work students' hypothetical, glossary -Develop presentation. The understanding ☐ Individual simulation, to formalize. whole class communication by asking work sheet, head, symbols, Acquire the discusses the questions, state, tape, edit, erase technical meaning of the slide listening to vocabulary of the content. Student their answers. Communicative Self topic keep their own structures paper-based assessment all the previous glossary by adding and ongoing communicative all the new words assessment: structures After that the T. check explains the topic participation and then the and interest students are invites to explain what they have understood

3 35 - Understand how The teacher shows Skills ☐ Whole • U1_L1 ALL1.pdf Formative to implement a the presentation on class assessment: Slides 33-45 S R W program for a the LIM, the whole ☐ Group teacher's Turing machine class reads slide by work check on Understand the slide the **Key vocabulary** ☐ Pair work students' concept of presentation. The quintuple, transition understanding ☐ Individual transition function whole class function, working by asking work and Turing discusses the alphabet, blank symbol questions, machine's state meaning of the slide listening to Communicative content. Student their answers. create a paper structures Self based glossary keep their own all the previous Develop paper-based assessment communicative communication glossary by adding and ongoing structures all the new words Acquire the assessment: technical After that the T. check vocabulary of the explains the topic participation topic and then the and interest students are invites to explain what they have understood

 Unit number
 1
 Lesson number
 4
 Title
 Turing machine simulator

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1 15'	Understand how to use an online Turing machine simulator -Understand how to implement a simple algorithm and write the code for the Turing machine simulator -create a paper based glossary -Develop	The teacher explains how does it work the Turing machine simulator.	Skills L S R W Key vocabulary processing, executing condition, compile code, even, odd.	■ Whole class Group work Pair work Individual work	• U1_L4_ALL1.pdf	Formative assessment: teacher's check on students' understanding by asking questions, listening to	
		based glossary -Develop communication -Acquire the technical vocabulary of the topic		Communicative structures all the previous communicative structures			their answers Self assessment and ongoing assessment: check participation and interest

2	35	-Implements simples program for a Turing machine simulator - Develop communication	Students work in pairs and must implement simple algorithms and run them on the Turing	L S R W Key vocabulary processing, executing condition, compile code, even, odd.	☐ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• U1_L4_ALL2.pdf	Formative assessment: teacher's check on students' understanding by asking questions,
			machine simulator using their own phone	Communicative structures all the previous communicative structures			listening to their answers. Self assessment and ongoing assessment: - check participation and interest

Unit number 2 Lesson number 1 Title Introduction to Two-dimensional array

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	10'	Acquire the english technical vocabulary about arrays in programming	Teacher lists the basic technical terms about arrays in programming . Students keep their own paper-based glossary by adding all the new words	Key vocabulary index. cell ,indexing array Communicative structures What is a What does it mean How do you spell that	■ Whole class □ Group work □ Pair work □ Individual work		Formative assessment: teacher's check on students' understanding by asking questions, listening to their answers. Self assessment and ongoing assessment: - check participation and interest

2 40' To be able to: -Teacher shows the Skills Whole • U2 L1 ALL1.pdf Formative understand what presentation on the class assessment: Slides 1-5 S R W is a two LIM. the whole class ☐ Group teacher's reads one slide at work dimensional check on **Key vocabulary** □ Pair work arrays -create a time. The whole class students' to scan, to load and all paper based discusses the meaning understanding ☐ Individual the previous key of the slide content. glossary by asking work vocabulary Develop Students keep their questions, communication own paper-based listening to Communicative glossary by adding all Acquire the their answers. structures the new words After Self technical How would you do ... By vocabulary of that teacher explains assessment considering... Let's the topic the topic and then the and ongoing think..... students are invites to assessment: explain what they check have understood. participation and interest

Unit number 2 Lesson number 2 Title Two-dimensional array: size and how to access

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	15'	To be able to: - Remember what has been done the previous lesson -Recall the key words - Discuss about the topic	Brief overview of the previous lesson using an open class discussion. Teacher writes on the blackboard the key words that students don't remember. Students write in their glossaries all the key words they don't remember.	Key vocabulary all the previous key vocabulary Communicative structures all the previous communicative structures	■ Whole class Group work Pair work Individual work		Formative assessment: teacher's check on students' understanding by asking questions, listening to their answers. Self assessment and ongoing assessment: - check participation

2 40' -Define the size Teacher shows the Skills Whole • U2 L1 ALL1.pdf Formative of 2-dim array presentation on the class assessment: Slides 6-13 S R W Declare a 2-dim LIM. the whole class ☐ Group teacher's reads one slide at work array -Access to check on **Key vocabulary** □ Pair work 2-dim array: time. The whole class students' all the previous key array scan. discusses the meaning understanding ☐ Individual vocabulary of the slide content. Load data into by asking work 2-dim array -Students keep their questions, Communicative own paper-based listening to Create a paper structures glossary by adding all based glossary their answers. all the previous the new words After Self Develop communicative communication that teacher explains assessment structures the topic and then the and ongoing students are invites to assessment: explain what they check have understood. participation and interest

3 30' -Considering a Teacher assigns an Skills ☐ Whole • U2 L1 ALL1.pdf Formative two-dimensional exercise showing the class assessment: Slides 14-15 L | S | R W array of text on the LIM. ☐ Group teacher's integers, to be Student, working in work check on **Key vocabulary** able to sum all pair, implement the ■ Pair work students' all the previous key requested program the values understanding ☐ Individual vocabulary using pseudo contained in the by asking work array's -Develop encoding. After that questions, Communicative communication .teacher shows the listening to structures right encoding on the their answers. all the previous blackboard. Teacher Self communicative and students discuss assessment structures about and ongoing implementations. assessment: check participation and interest

4	15'	-Declare and initialize a 2-dim array - Understand what a 2-dim array rank is	Teacher shows the presentation on the LIM, the whole class reads one slide at time. The whole class discusses the meaning of the slide content.	Skills L S R W Key vocabulary all the previous key vocabulary	■ Whole class Group work Pair work Individual work	• U2_L1_ALL1.pdf Slides 16-17	assessment: teacher's check on students' understanding by asking
			Students keep their own paper-based glossary by adding all the new words After that teacher explains the topic and then the students are invites to explain what they have understood.	Communicative structures all the previous communicative structures			questions, listening to their answers. Self assessment and ongoing assessment: - check participation and interest

Unit number 2 Lesson number 3 Title Two-dimensional array: basic algorithm part 1

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	50'	Implement basic algorithm about 2dim arrays: -how to select the elements of a 2-dim arrays -find the maximum and minimum element of a 2-dim arrays and their positions -compare two 2-dim arrays - Develop communication.	Teacher assigns an exercise showing the text on the LIM. Student, working in pair, implement the requested program using pseudo encoding. After that ,teacher shows the right encoding on the blackboard. Teacher and students discuss about implementations.	Key vocabulary all the previous key vocabulary Communicative structures all the previous communicative structures	□ Whole class □ Group work ■ Pair work □ Individual work	• U2_L3_ALL1.pdf Slides 1-9	Formative assessment: teacher's check on students' understanding by asking questions, listening to their answers. Self assessment and ongoing assessment: - check participation and interest

Unit number 2 Lesson number 4 Title Two-dimensional array: basic algorithm part 2

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	50'	Implement basic algorithm about 2-dim arrays: -find the rows and columns where the sum is the highest and the smallest -calculate the sum and product of an array's elementsdetermine the number of null elements -Develop communication.	Teacher assigns an exercise showing the text on the LIM. Student, working in pair, implement the requested program using pseudo encoding. After that ,teacher shows the right encoding on the blackboard. Teacher and students discuss about implementations	Skills L S R W Key vocabulary all the previous key vocabulary Communicative structures all the previous communicative structures	□ Whole class □ Group work ■ Pair work □ Individual work	• U2_L3_ALL1.pdf Slides 10-15	Formative assessment: teacher's check on students' understanding by asking questions, listening to their answers. Self assessment and ongoing assessment: - check participation and interest

Unit number 3 Lesson number 1 Title computer lab: object-oriented programming part 1

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	25'	Acquire english technical vocabulary about object oriented programming	Teacher lists the basic technical terms about programming . Students add all the new words to their own paper-based glossary	Key vocabulary class, methods, object, fields package, loop, iteration, selection, sequence, compiler, variable, parameters, index, interface, instruction, global data , constructor, casting, declaration, initialization, string , float ,double Communicative structures What is a What does it mean	■ Whole class Group work Pair work Individual work		Formative assessment: teacher's check on students' understanding by asking questions, listening to their answers. Self assessment and ongoing assessment: - check participation and interest

2	35	Considering a programming problem, to be able to: - Understand the text - Identify all the task	Teacher assigns an exercise showing the text on the LIM. Students read the text, identify the words they do not know and write them on their glossary. Students, working in pairs, try to highlight the objectives of the problem and build a concept map.	Key vocabulary Elevator, Reservation, trip, floor, factory, building Communicative structures all the previous communicative structures	□ Whole class □ Group work ■ Pair work □ Individual work	• U3_L1_ALL1.pdf	Formative assessment: teacher's check on students' understanding by asking questions, listening to their answers. Self assessment and ongoing assessment: - check participation and interest
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3 50' Considering a Student working in Skills ☐ Whole • U3 L1 ALL1.pdf Formative programming pair to build the UML class assessment: S R W scheme of the problem to be ☐ Group teacher's work able to: - Discuss problem. After that. check on **Key vocabulary** Pair work about possible teacher shows the students' all the previous key solutions - Build UML scheme understanding ☐ Individual vocabulary designed for the the solution by by asking work structuring it for problem. It follows questions, Communicative object-oriented an open class debate listening to structures about the possible programming their answers. Which solution is solution. Self Build the UML better... How many scheme with all assessment classes have you the necessary and ongoing designed How many classes assessment: attributes does a class check have participation and interest

40' 4 implement in C# Student implement Skills ☐ Whole • U3 L1 ALL1.pdf Formative the first class in C# the first class class assessment: S R W L designed in the designed in the UML ☐ Group teacher's UML ("Reservation" class) work check on **Key vocabulary** ("Reservation" . After that, teacher ☐ Pair work students' all the previous key shows the correct class): - Build the understanding ■ Individual vocabulary class fields, the implementation and by asking work constructor, get explaining the code. questions, Communicative and set methods It follows an open listening to structures and all methods class debate about their answers. all the previous the possible coding Self communicative solution. assessment structures and ongoing assessment: check participation and interest

Unit number 3 Lesson number 2 Title computer lab: object-oriented programming part 2

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	30'	To be able to: -Remember what has been done the previous lesson -Recall the key words - Discuss about the topic	Brief overview of the previous lesson using an open class discussion. Teacher write on the blackboard the key words that students don't remember. Students write in their glossaries all the key words they don't remember.	Key vocabulary all the previous key vocabulary Communicative structures all the previous communicative structures	■ Whole class Group work Pair work Individual work		Formative assessment: teacher's check on students' understanding by asking questions, listening to their answers. Self assessment and ongoing assessment: - check participation and interest

2 120 Implement, in Students implement in Skills ☐ Whole • U3 L1 ALL1.pdf Formative C#, the C# the first class class assessment: S R W second class designed in the UML ☐ Group teacher's of the ("Elevator" class). work check on **Key vocabulary** ■ Pair work problem Students work in pairs students' sentinel, monitor, ("Elevator" and write the code understanding ☐ Individual status, queue according to the UML class): - Build by asking work the class scheme, implementing it questions, Communicative fields, the step by step. listening to structures Implementation of each constructor, their answers. all the previous step required about 30'. Self get and set communicative methods and The teacher makes an assessment structures all methods ongoing review showing and ongoing the correct code after assessment: each step and the whole check class discuss about the participation code. and interest

Unit number 3 Lesson number 3 Title computer lab: object-oriented programming part 3

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	50'	Implement the third class ("Run Elevator") of the problem in C#: fields ,constructor getter and setter methods,	Student implement the third class ("Elevator") and the main class in C#. Students work in pairs and write the code according to the UML scheme, implementing it step by step. Implementation of each step required about 30'.	Skills L S R W Key vocabulary Il the previous key vocabulary Communicative structures all the previous	□ Whole class □ Group work ■ Pair work □ Individual work	• U3_L1_ALL1.pdf	Formative assessment: teacher's check on students' understanding by asking questions, listening to their answers.
		Implement on the "main" the class each	The teacher makes an ongoing review showing the correct code after each step and the whole class discuss about the code.	communicative structures			Self assessment and ongoing assessment: - check participation and interest

Unit number 3 Lesson number 4 Title computer lab: object-oriented programming: test

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	50'	Considering a programming problem to be able to: - Build the UML scheme with all the necessary classes - Implement all the classes in C#	Teacher tests students with an exercise of object oriented programming that summarizes what has been done during the previous lessons.	Skills L S R W Key vocabulary all the previous key vocabulary Communicative structures all the previous communicative structures	□ Whole class □ Group work □ Pair work ■ Individual work	• U3_L4_ALL4.pdf	Formative assessment: teacher's check on students' understanding by asking questions, listening to their answers. Self assessment and ongoing assessment: -check participation