

Schedule

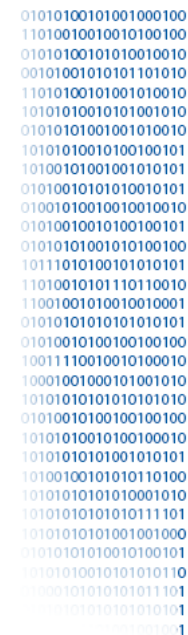
- *Overview (probably incomplete)*
 - Eno Tõnisson (20 min)
- *Practical example about school and industry collaboration in ICT sector*
 - Doris Põld and Jüri Jõema (10 min)
- *Educational Robotics in Estonia*
 - Heilo Altin (15 min)
- *Robotic Teaching and Learning Concept*
 - Raivo Sell (15 min)
- *Programming in school computer club (Scratch)(Python)*
 - Tauno Palts (15 min)

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Eno Tõnisson

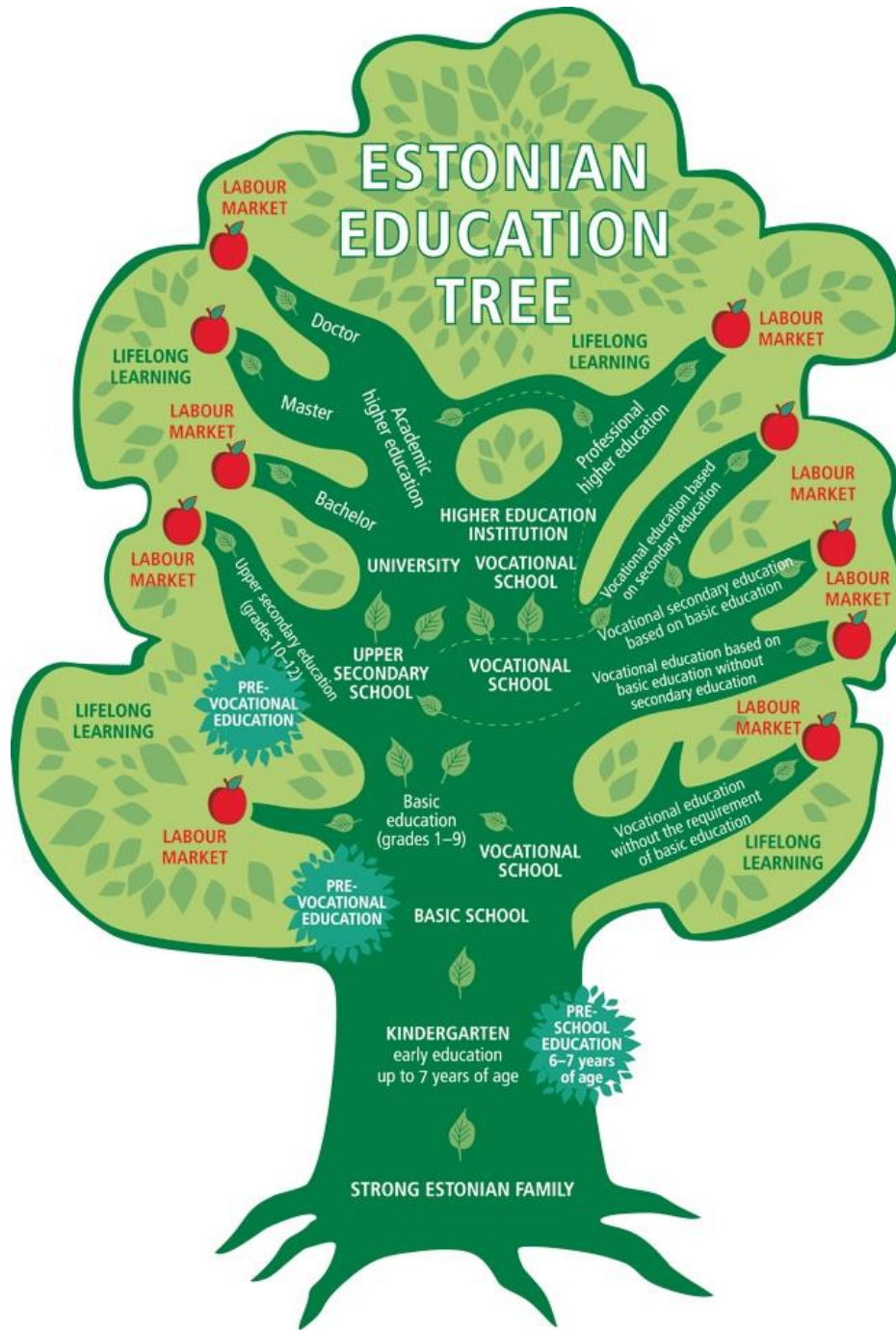
- 2001 - ... University of Tartu, Faculty of Mathematics and Computer Science, Institute of Computer Science; Lecturer
- 1994 - 2000 University of Tartu, Faculty of Mathematics and Computer Science, Institute of Pure Mathematics, Chair of Didactics of Mathematics; Assistant
- 1990 - 1998 Tartu Tamme Gymnasium; teacher



Overview

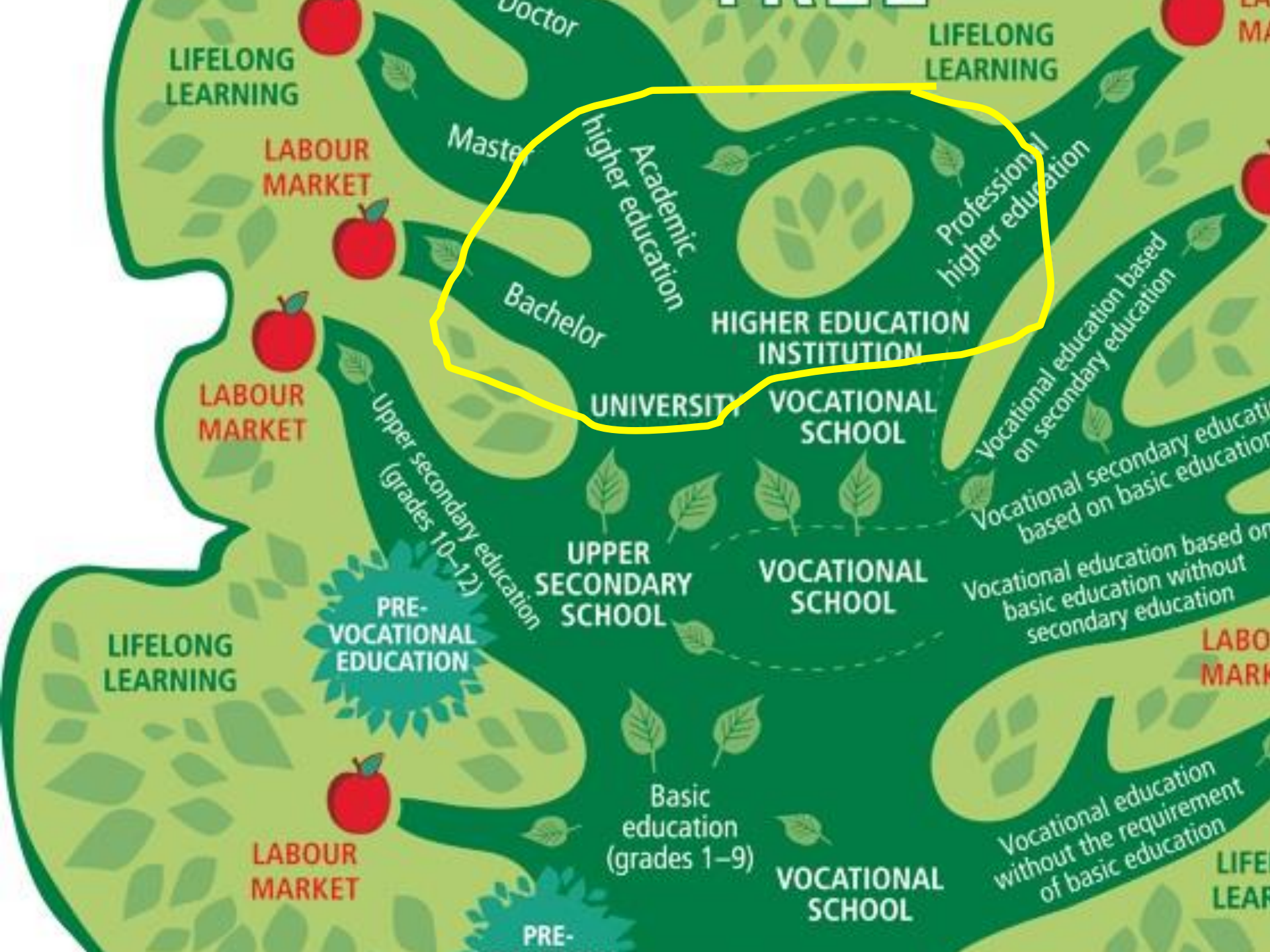
- ICT, CS education in Estonia
 - Bachelors' study, professional higher education
 - Need for labour market in ICT sector (2020)
 - Report (2013)
- School
 - in curricula
 - additional activities
 - courses
 - school visits, doors open days ...
 - competitions
 - teacher training
 - ...





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The first level of higher education ICT, CS admission 2012/13

- Bachelor's study
 - Tallinn University of Technology (490 students)
 - Tallinn University (84 students)
 - University of Tartu (198 students)
- Professional higher education
 - Computer College (42 students)
 - Estonian Entrepreneurship University Mainor (53 students)
 - Estonian Information Technology College (297 students)
 - Tallinn University of Technology (54 students)
 - Tallinn University (22 students)
 - Võru County Vocational Training Centre (22 students)
- Vocational education
 - different levels

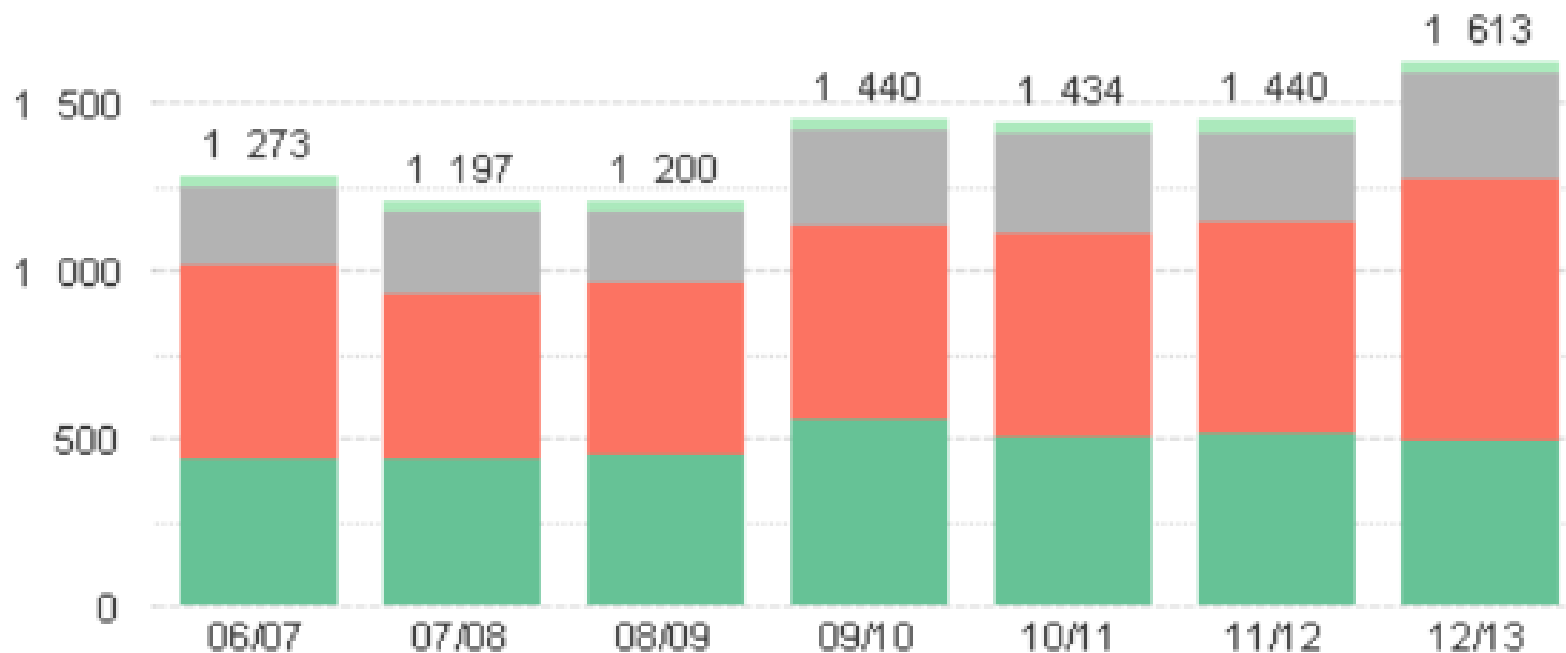
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Admitted

Vastuvõetute arv õpete lõikes



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UNIVERSITAS TARTUENSIS
1632

TTÜ

Eesti Infotehnoloogia Koolidz
The Estonian Information Technology College

ITL

Eesti tuleviku heaks

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Euroopa Regionaalarengu Fond

Year 2020

- Taavi Kotka

- Ministry of Economic Affairs and Communications

- Deputy Secretary General for Communication and State Information Systems

- BSc (Informatics), University of Tartu, 2013

- Year 2020

- ICT sector is leading branch of economy

- number of employees is **doubled** compared with present



Mapping the status of and need for the Estonian labour with ICT competences

- Report 2013
 - Praxis, Center for Policy Studies
- 2013
 - 16 287 ICT professionals in Estonia
 - 8474 work in ICT sector
 - 7813 in other areas of activity
- 2013 → 2020
 - Higher education graduates
 - needed is 4200-5600
 - in case of a more optimistic scenario, the **shortage of specialists may increase with the current teaching volumes**
 - The focus should be on the preparation of software developers
 - developers, test specialists, analysts, architects, relevant field managers



Gender

- ICT employees
 - 78% male (92% of software developers)
 - 22% female

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Priority

- 2013
 - ICT, CS Students
 - 25% more than in 2009
 - More foreign students
- Programs
 - IT Academy program
 - ICT program
 - our project

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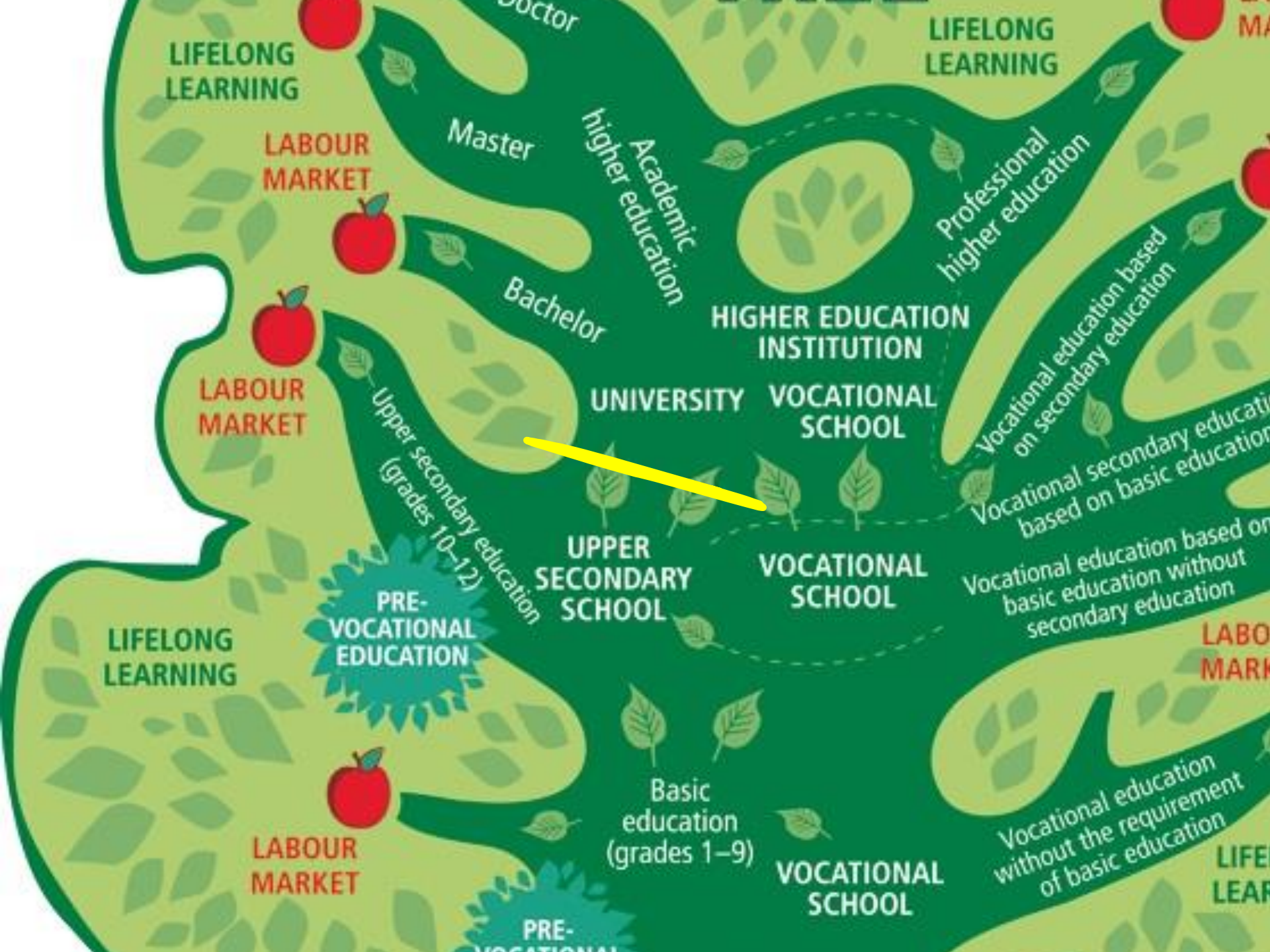
Slogans

- More students!
 - right students!
- Gender equality!?
- How to select the students?
 - How to inform the students before decision-making?
 - considered decision
- How to help them keep the course?

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What should they know for considered decision-making?

- About programming, algorithms
 - software developers!
- About life in ICT companies and elsewhere
- About use of computers
- ...

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What do they know?

- Most probably
 - skills for basic use of ICT
 - texts, spreadsheets ...
- Probably
 - some experiences with educational software
 - biology, mathematics ...
- Almost nothing about programming
 - at least from regular curriculum of secondary school

Depends on the school and the student!



National Curriculum of Upper Secondary Schools

- 1996 – **optional** course “Informatics” (4*35 hours)
- 2002 – **cross-curricular** topic “IT and media”
- 2011 – interdisciplinary **optional** courses (35 hours)
 - 1) ‘Natural Science, Technology and Society’
 - 2) ‘**Mechatronics and Robotics**’
 - TUT, UT
 - 3) ‘3D Modelling’
 - 4) ‘Technical Drawing’
 - 5) ‘Using Computers for Inquiry’
 - 6) ‘**Basics of Programming and Development of Software Applications**’
 - Jüri Vilipõld, ... TUT
 - Scratch, Python, Visual Basic



Optional?

- Why
 - lack of qualified teachers?
- Still many schools have ICT lessons
 - but programming???

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Teacher training

- Complete curricula
 - Teacher of Mathematics and Informatics
 - University of Tartu
 - Teacher of Computer Sciences, School ICT Manager
 - Tallinn University
 - Technical Teacher
 - Tallinn University of Technology

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Teacher training

- In-service Courses

- TUT

- Programmeerimise õpetamine koolides, programmeerimissüsteemi Scratch abil
 - Scratch edasijõudnutele
 - Scratch kasutamine õppematerjalide ja esitluste loomiseks
 - VBA kasutamine rakenduste loomisel ja programmeerimisel
 - Arendustöö (modelleerimine, analüüs, disain)
 - Rakenduste loomine ja programmeerimise alused
 - Mikrokontrollerid ja praktiline robotika
 - ...

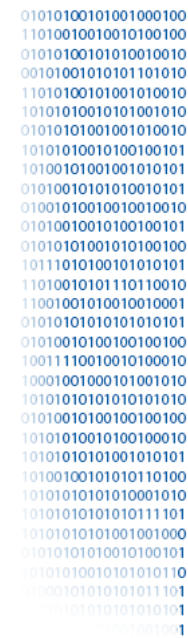
- UT

- Programmeerimine huviringis (Scratch)
 - Programmeerimine huviringis (Python)



For students

- Afterschool activities, in schools
 - Computer clubs
 - Robotics
 - SmartLabs (NutLabor)
 - 2012/2013 school year
 - more than 600 youth participated in Smartlabs
 - 36 Smartlabs across Estonia
- At all in Estonia 68 000 pupils
 - 1,1% technology
 - 40% sports
 - 38% art, music
 - nature, culture



For students

- At universities
 - TUT
 - Tehnoloogiakool („Technology School“)
 - Robot igäühele!
 - Kraapurid - sissrejuhatus programmeerimisse (Scratch)
 - Rakenduste loomine ja programmeerimise alused (*Basics of Programming and Development of Software Applications*)
 - ...
 - UT
 - Teaduskool („Science School“),
 - Programmeerimine keeles PHP
 - Programmeerimise alused I
 - Programmeerimise algkursus
 - Institute of Computer Science
 - Teeme ise arvutimänge – algus
 - ...



Eesti tuleviku heaks



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Competitions

- *Informatics olympiade*
 - only ca 60 participants (less than 10 years ago)
- *Beaver*. International Contest on Informatics and Computer Fluency
 - 2012 in Estonia
 - 1961 + 1343 + 708 participants
- Robotics competitions

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School visits

- Different activities
 - Tagasi kooli, Back to School
 - Association of Information Technology and Telecommunications (ITL)
 - Universities
- Duration
 - 1 lesson
 - all day activities
 - ...



Open doors days, Excursions at Universities

- TUT
- IT college
- UT

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IKT karjäärivalikute põhjuste uuring
Conceptual framework for increasing society's commitment in ICT

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