pädagogische hochschule schwyz

schwyz university of teacher education

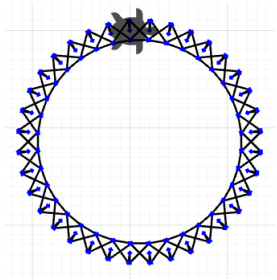
Creative Programming with TurtleStitch

Learners Create Embroidery Designs and Learning Materials

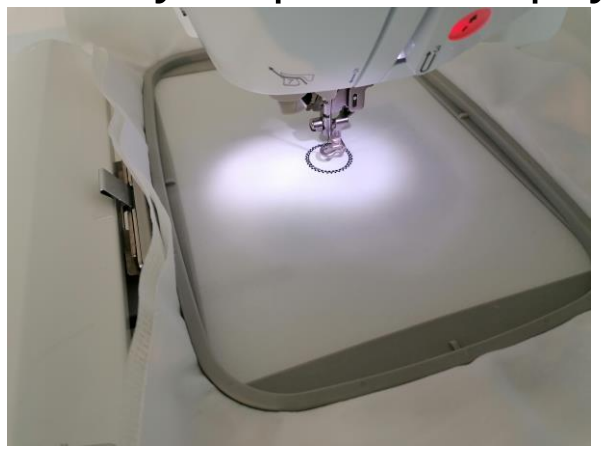
Principle of Programming with TurtleStitch

- Block-based programming

- See direct results on screen



- Stitch your pattern for physical result



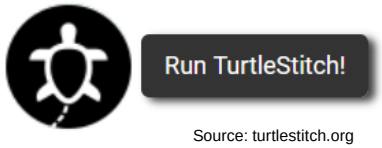
- Export your program

Agenda

- About us

- Report on project days with students

- Creative phase
  - Short demonstration of TurtleStitch basics
  - Follow the students’ instructions from learning cards (beginner's cards)
  - Discussion and reflection of students’ work



Source: turtlestitch.org

- Brush up

About us

- Schwyz University of Teacher Education, Institute of Media and School (IMS)

- Prof. Dr. Mareen Przybylla: Head of Endowment Professorship in Computer Science Education (Secondary School Level)

- Beat Horat: Junior Researcher in Computer Science Education

Project at Partner School

- Project days at “Sek Eins Höfe”
  - Partner school that is often in contact with us
  - Two days with variety of different topics and workshops
  - Creative event to introduce the summer break

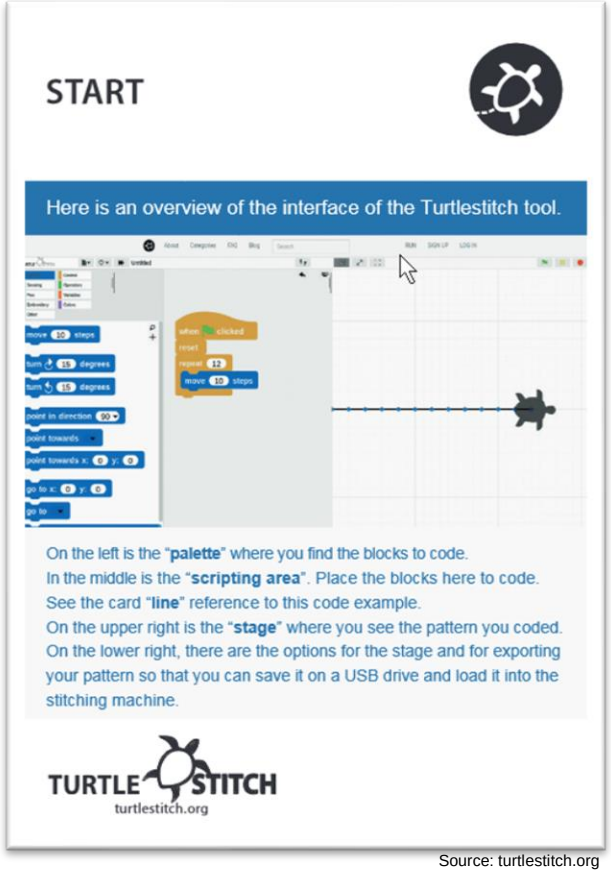
- Programming workshops
  - Opportunity to teach programming with TurtleStitch
  - One class of lower secondary school students (14 year old)
  - Entire class assigned to the workshop; no mixing of classes due to Covid
  - Split in two groups of 9 and 8 students respectively, one full day per group
  - Me as presenter, Mareen and class teacher helping out for questions and coaching

Process of TurtleStitch Workshops

- Agenda for each group (one workshop day)

  - Morning program
    - Introduction with examples
    - Free hands-on training time with support of teachers
    - Further input sequences in between

  - Afternoon
    - Choose an individual project
    - Stitch the project (supervision of teachers)
    - Create learning card that comments and explains the project based on the examples of TurtleStitch Beginner Cards

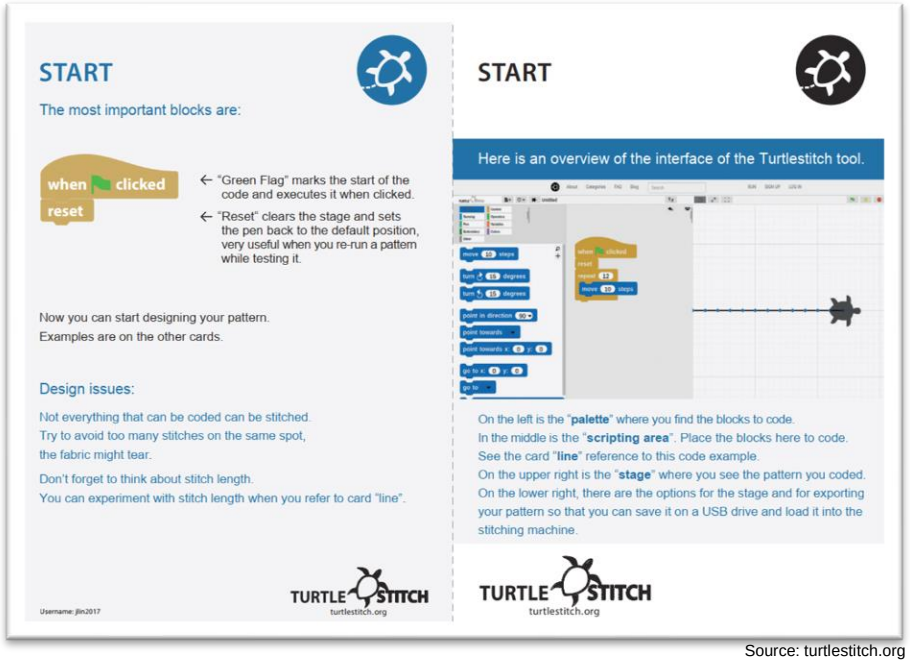


Source: turtlestitch.org

Why Learning Cards?

- Original learning cards are a nice way to explain TurtleStitch

- Provide a stage for the students to show their project
- See what the students fully understood and could explain in their own words



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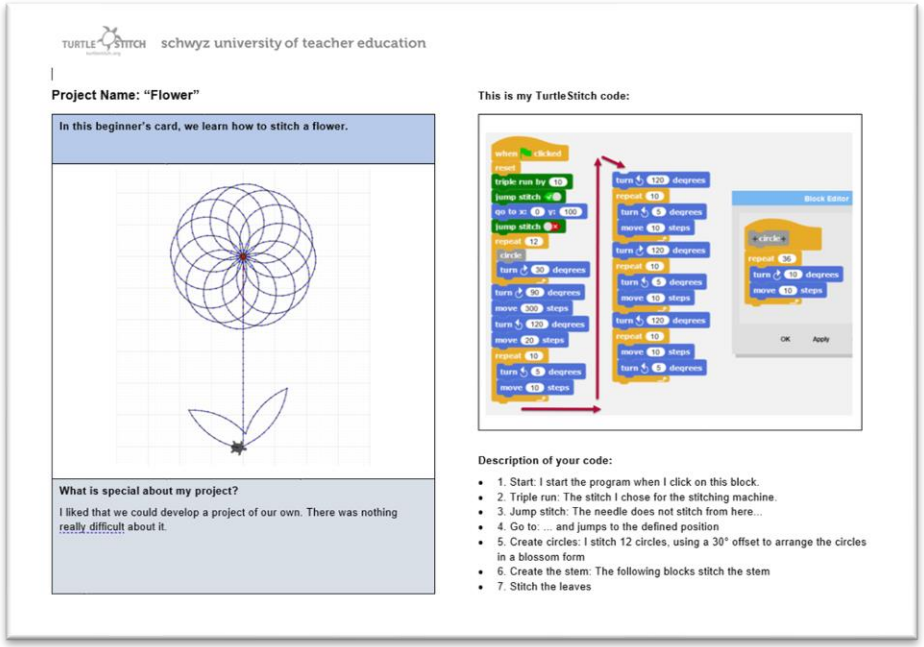
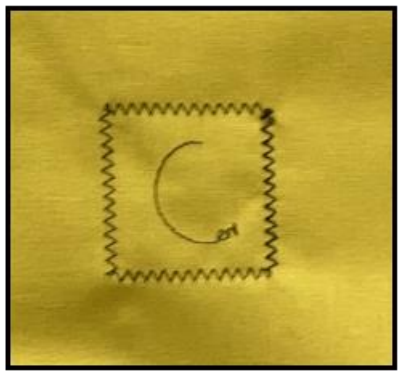
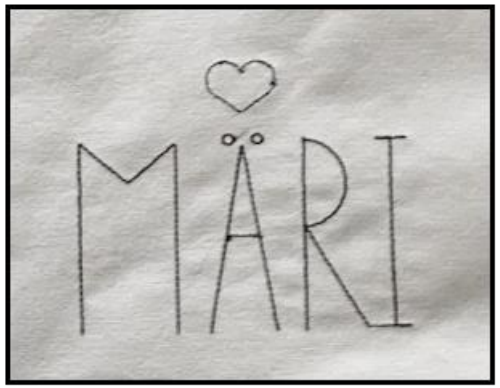
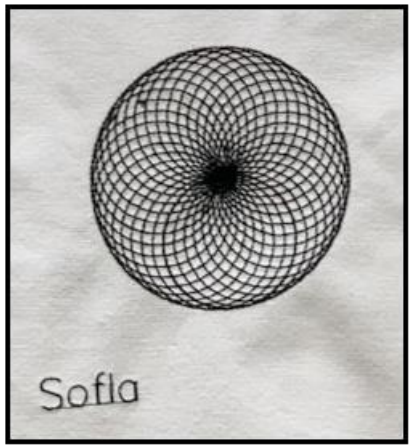
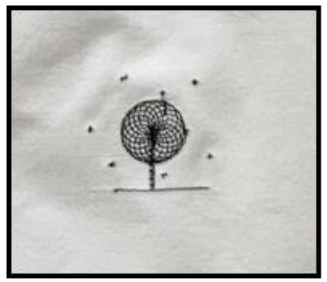
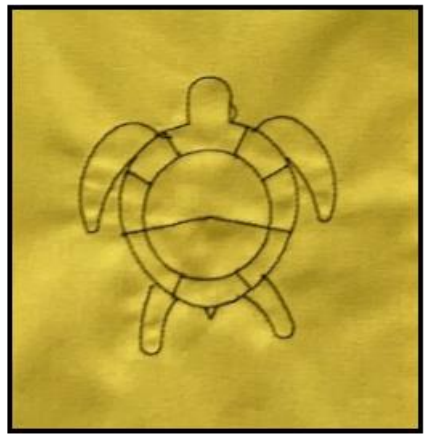


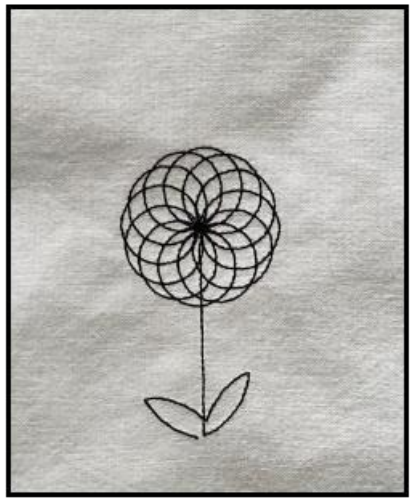


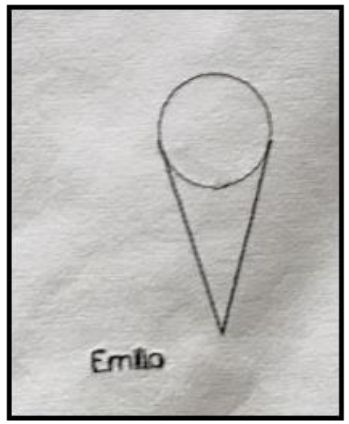

MÄRI


Sofia



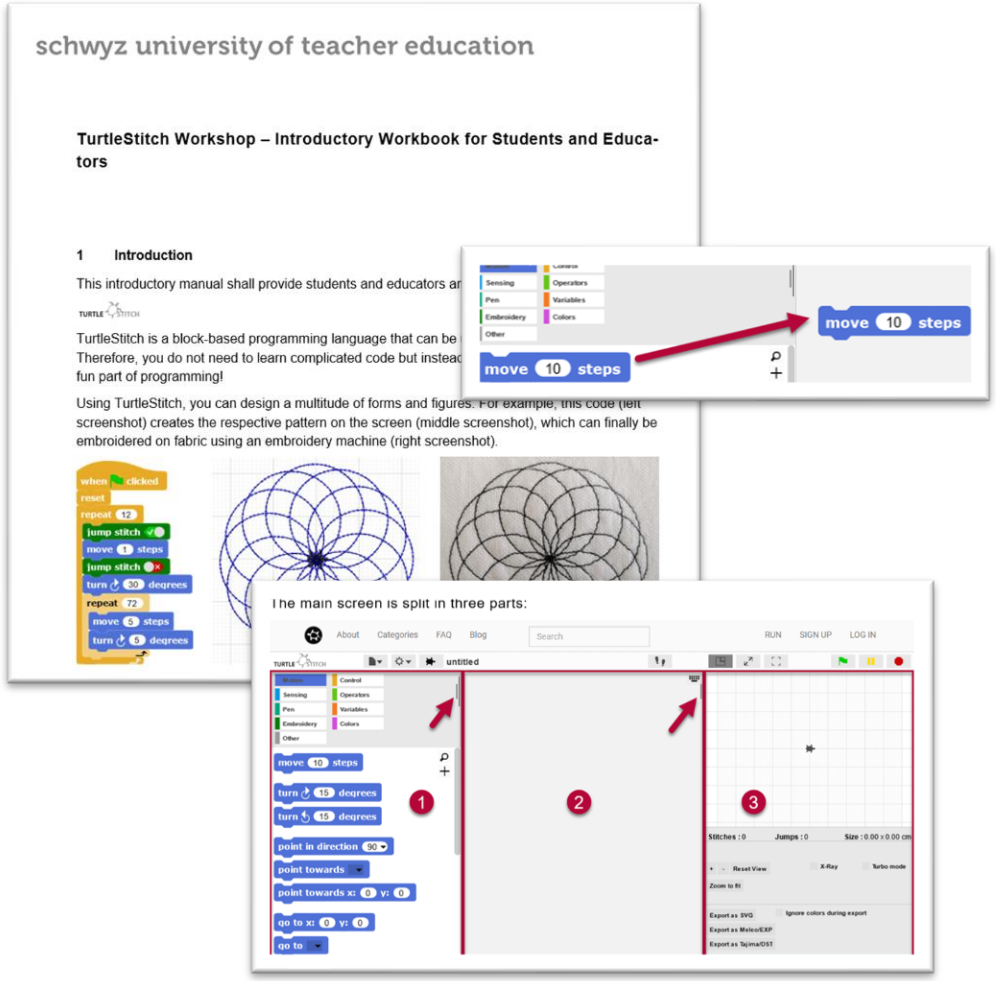





Emilia

Learning Materials

- **Workbook for TurtleStitch**



- **Manual for embroidery machine**

Introducing TurtleStitch

- Introductory workbook for TurtleStitch
  - Used as reference guide during workshops
  - Works as self-learning program for students and educators
  - Examples based on learning cards, similar in style
  - Detailed and quite long, so only extracts demonstrated today

- Currently available in English and German
  - https://mia.phsz.ch/Informatikdidaktik/TurtleStitch

Introducing Embroidery Machine

- Introductory manual for embroidery machine
  - We used “Brother Innov-is 750E” machines
  - *This is not an assessment of any kind; we are just sharing information* ☺
  - Other presenters might have more experience with embroidery machines

- Note on our workshop setting
  - Stitching was managed entirely by teachers mainly for safety reasons
  - Reserve more time when students need to be instructed to embroidery machines
- Currently only available in German
  - https://mia.phsz.ch/Informatikdidaktik/TurtleStitch

Stitching Material

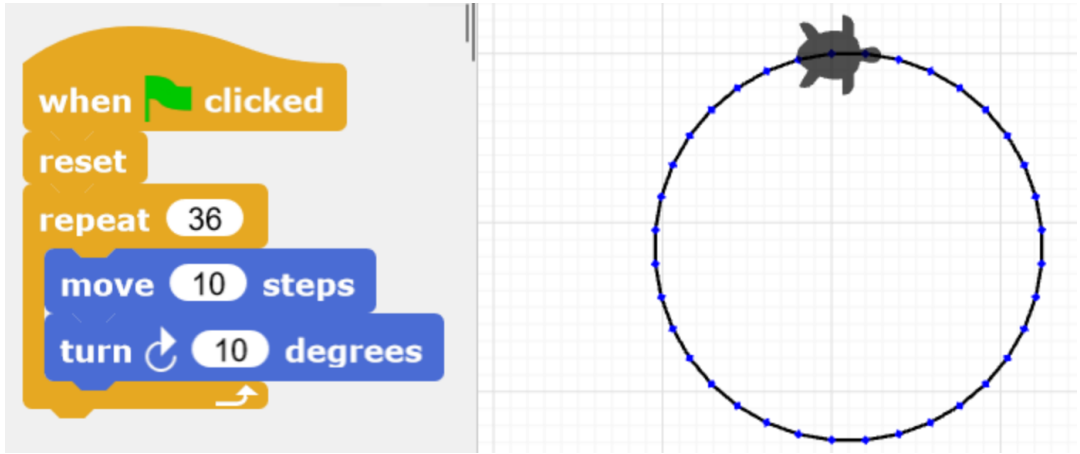
- Suitability of different materials depends heavily on embroidery machine
- Our experience on material for “Brother Innov-is 750E” is included in the machine manual
- In a nutshell
  - Use **thin but ‘stable’ fabric**
    such as cotton, stretchable fabric
    would increase difficulty level significantly
  - Always using **stabilizer fleece**,
    enhances precision of embroidery
  - **Bobbin thread** is different from
    embroidery thread ☺

- A lot of practice necessary
  - Allow for trial-and-error time... and do not start with your favorite shirt ☺
  - Learn to know the embroidery machine and the material used

Demonstration of TurtleStitch Basics (1)

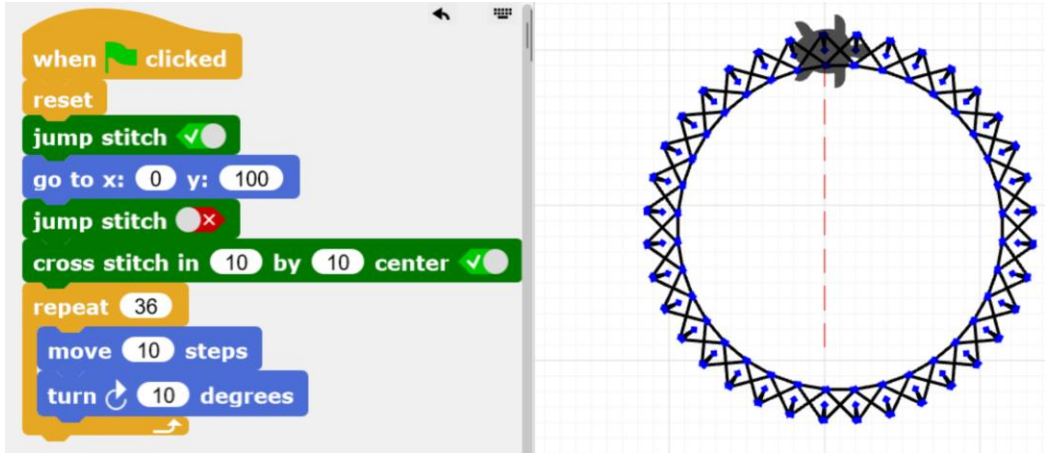
- Live demo: Very brief, but there is more detail in the manual and feel free to ask questions

- Navigate to www.turtlestitch.org
- Welcome page vs. “RUN”
- Palette / Coding Area / Stage
- Most important blocks
  - “move n steps”
  - “reset”
  - “when ‘green flag’ clicked”
  - “repeat n”
  - “turn n degrees”

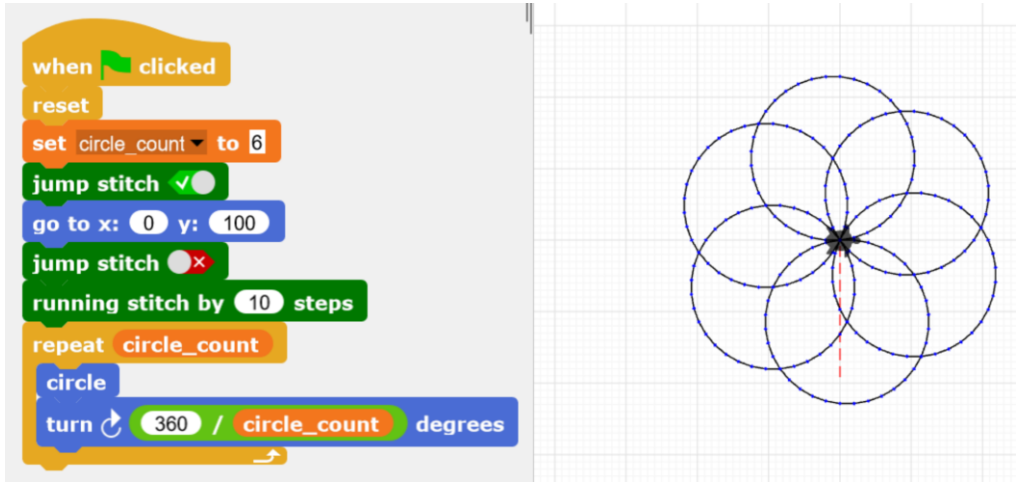


Demonstration of TurtleStitch Basics (2)

- Choose embroidery settings
- Jump stitches



- Personal blocks
- Variables



Examine Students' Learning Cards and Codes (1)

- **Group work in breakout rooms (approximately 20 minutes)**

- Find the material here https://mia.phsz.ch/Informatikdidaktik/TurtleStitch
  - Learning cards and code from six student projects
  - Instructions as seen here
  - Questions for discussion

What was easy to understand for us, what was difficult?

Where did the students have problems?

Was the explanation on the students' learning cards sufficient?

Did you spot anything special in the cards or the code?

Which advise would you give the students to improve the description on their card?

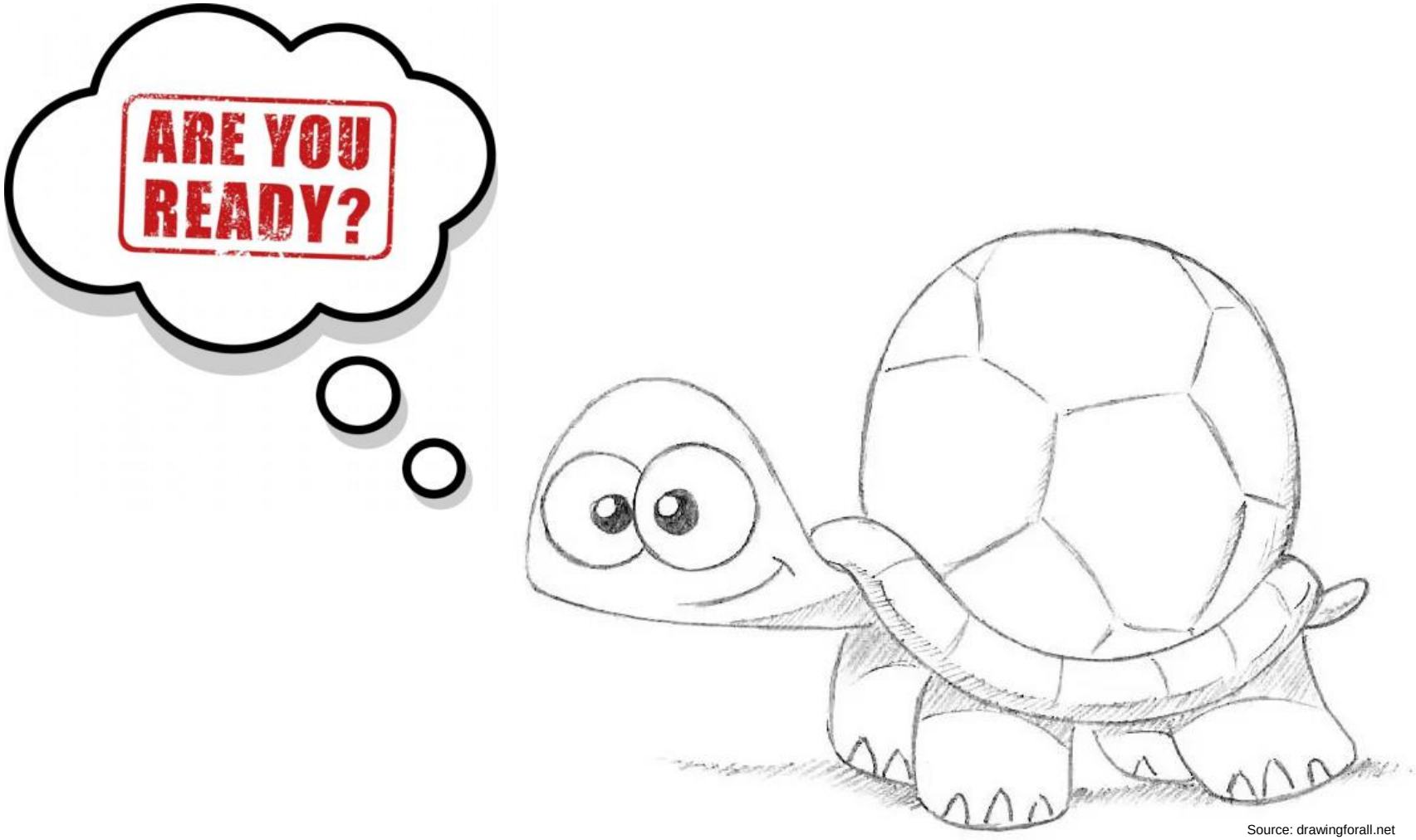
Examine Students' Learning Cards and Codes (2)

- **Group work in breakout rooms (approximately 20 minutes)**

- Breakout Room 1 works with material from project 01 and so on
- Follow the student's instructions to build the project and understand the code
- You can drag and drop the code (xml file) to turtle stitch if you like

- When finished, you can examine other projects individually (lower project numbers = easier)

Ready for Breakrooms?



Source: drawingforall.net

Discussion

- What was easy to understand for us, what was difficult?
- Where did the students have problems?
- Was the explanation on the students' learning cards sufficient?
- Did you spot anything special in the cards or the code?
- Which advise would you give the students to improve the description on their card?

Questions?

WHEN? WHY? WHERE? WHO? WHAT? HOW? WHY? WHEN? WHO? WHERE? WHAT? HOW? WHEN? WHAT? WHERE? WHO? WHEN? HOW? HOW? WHEN? WHERE? WHERE? WHOSE? WHICH? WHEN? WHERE? HOW? WHAT? HOW? WHY? WHO? WHERE? WHAT? HOW? WHY? HOW? WHAT? HOW? WHY? WHO? WHERE? WHAT? HOW? WHERE? WHICH? WHOSE? WHEN? WHY? WHY? HOW? WHERE? WHO? WHOSE? WHERE? WHAT? HOW? WHY? WHERE? WHICH? WHOSE? WHEN? WHY? WHERE? WHAT? HOW? WHO? HOW? WHERE? WHAT? HOW? WHAT? HOW? WHY? WHERE? HOW?

Lessons Learned (1)

- Keep demo phases short
- Students profit significantly more when they creatively try whatever is on their mind

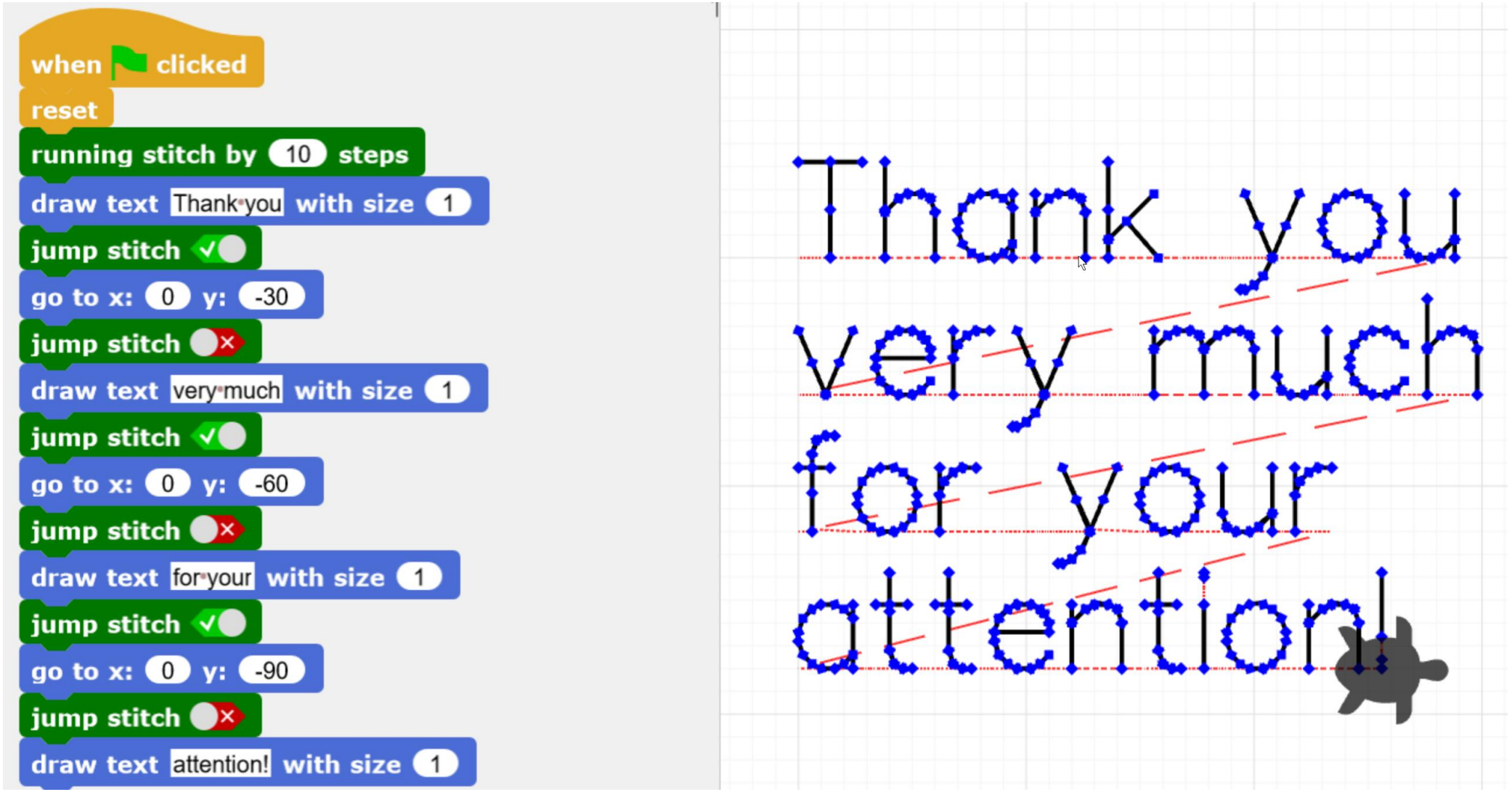
- **In our workshop**, some students seemed to be not interested...
  - Turned out that most of them were just insecure
  - Especially girls tended to express insecurity about coding and commented accordingly in the learning cards
  - However, the girls' overall results turned out more creative, more accurate and showed a much higher degree of understanding the code than compared to most of the male students

Lessons Learned (2)

- Handling the embroidery machines took up more teacher time than answering coding questions
- Try to involve advanced, diligent, careful students into machine handling

- When you an entire day, split into several sequences with new challenges each

- Exporting data to memory stick was a challenge for some students
- Diverse level of previous CS knowledge, further highlight the importance of creative phase so everybody can profit


when clicked
reset
running stitch by 10 steps
draw text Thank you with size 1
jump stitch
go to x: 0 y: -30
jump stitch
draw text very much with size 1
jump stitch
go to x: 0 y: -60
jump stitch
draw text for your with size 1
jump stitch
go to x: 0 y: -90
jump stitch
draw text attention! with size 1
Thank you
very much
for your
attention!