1. How many founders make up your team?

1 female Founder

6 student or early career volunteers.

2. What is the problem you're addressing?

Focus on telling us the problem people are facing and why they need a solution. Who has this problem?

The problem is to learn coding in a manner which engages children.

Lack of coding programs in Australia that are targeted specifically at changing curriculum and social needs.

Lack of emphasis of programming within schools in Australia.

Lack of Australian students studying programming and STEM in general. Many of the IT students now come from overseas, particularly at postgraduate level. Females are still in the minority within programming. Most of those undertaking Machine Learning are white or Asian males, transferring an unconscious bias into the algorithms created, and thus the rapid changes shaping society. 'Digital divide' particularly hits those in low socio-economic and minority status (e.g. Aboriginals).

Few teachers are integrating with the coding community (e.g. PyConAu Conference). Many teachers are under skilled and under time pressure to deliver. Within NSW 40% of teachers in STEM-related disciplines are more than 50 years old, indicating that retirement is on the horizon. Lack of support for early-career teachers by their school to teach out of their approved area. The Education Department does not collate data on the amount of "out-of-field" teachers, which run classes outside their area of expertise.

Major concern for Australia's education system is a shortage in quality teachers. Within Victoria, the student population is exploding, school leavers applying for teaching courses falling, the number of requirements for getting into a teaching degree is growing. More than a quarter of teachers in the job are leaving when in their 20s and 30s.

Australia sits within rapid global technological change, causing mass redundancies in 'tenure' companies (e.g. Telstra, Optus, ANZ etc.). 75% of jobs in the future are going to require STEM skills, many of which haven't been invented yet. 40-50% of jobs these days can be done better or more efficiently by automation or a computer.

3. How is this group of people / customers currently dealing with this problem? Is there a solution already? What is not working with existing solutions?

Victoria is looking to create a master teacher, responsible for teaching a specific area, for example math or science, in both primary and secondary. They would be paid equivalent to assistant principal, with a large increase in terms of their salary. The master teacher would drive teaching in that particular subject across that school, and across a cluster of schools.

Predominately the NSW government is focusing on scholarships to attract teachers into STEM. 31% of scholarship recipients withdraw prior to completing their required service period. Success of programs is not being effectively monitored, so it is difficult to assess if the programs are helping to address areas of shortage.

4. **Tell us about your idea.**
What is it? How does it work? How do you see technology being part of the solution? How will this idea make money? If you already have a product, tell us more about it and your process for creating it.

Little Geeklet Pty Ltd aims to intersect coding and children's book narrative with an interactive digital domain. In particular, it is looking to marry Computational Thinking with Design Thinking from a visual narrative context.

The vehicle is drag-and-drop visual programming similar to Scratch. Code is similar to leg blocks intersecting with each other. Visual code can directly translate to actual code, harnessing the look-cover-write learning methodology. Learners can create their own coded interactions based on an existing narrative and illustrations. Starting narrative will be taken from Fairy Tales, as these are ubiquitous across cultures, and have a deep psychological resonance with children and adults alike. The first language to learn will be Python, due to its ease of learning and use within professional computing.

A story can be captured by the learner, where they write and illustrate it themselves. AI can be used to assist with choices of story or code learning modules. Think wix use of AI to narrow down a website design, then the customer tailors it to their exact content requirements. Hierarchical Neural Story Generation (Fan et al., 2018) can be used to build a story, starting with a high level prompt to sketch the structure of the story (convolutional language model), followed by the story words generation (seq2seq).

https://arxiv.org/pdf/1805.04833.pdf

https://github.com/pytorch/fairseq/tree/master/examples/stories

Machine Learning can assist with an illustration, as part of the field of Algorithm Design, preparing assets and content (https://algorithms.design/). For example, SketchRNN is part of Google Project Magenta which recognizes and outputs "pigness" or "catness". This is different to explicitly asking the machine to sketch a pig or cat. When the recurrent neural network is trained on multiple sketches of a pig, then there are multiple solutions which we can visually identify as "pigness".

https://www.theatlantic.com/technology/archive/2017/06/google-drawing/529473/

Another approach might be to match key text phrases or captions with pictures. Dense captioning is where the computer detects objects and describes them in natural language (Johnson, J. 2016).

https://github.com/jcjohnson/densecap

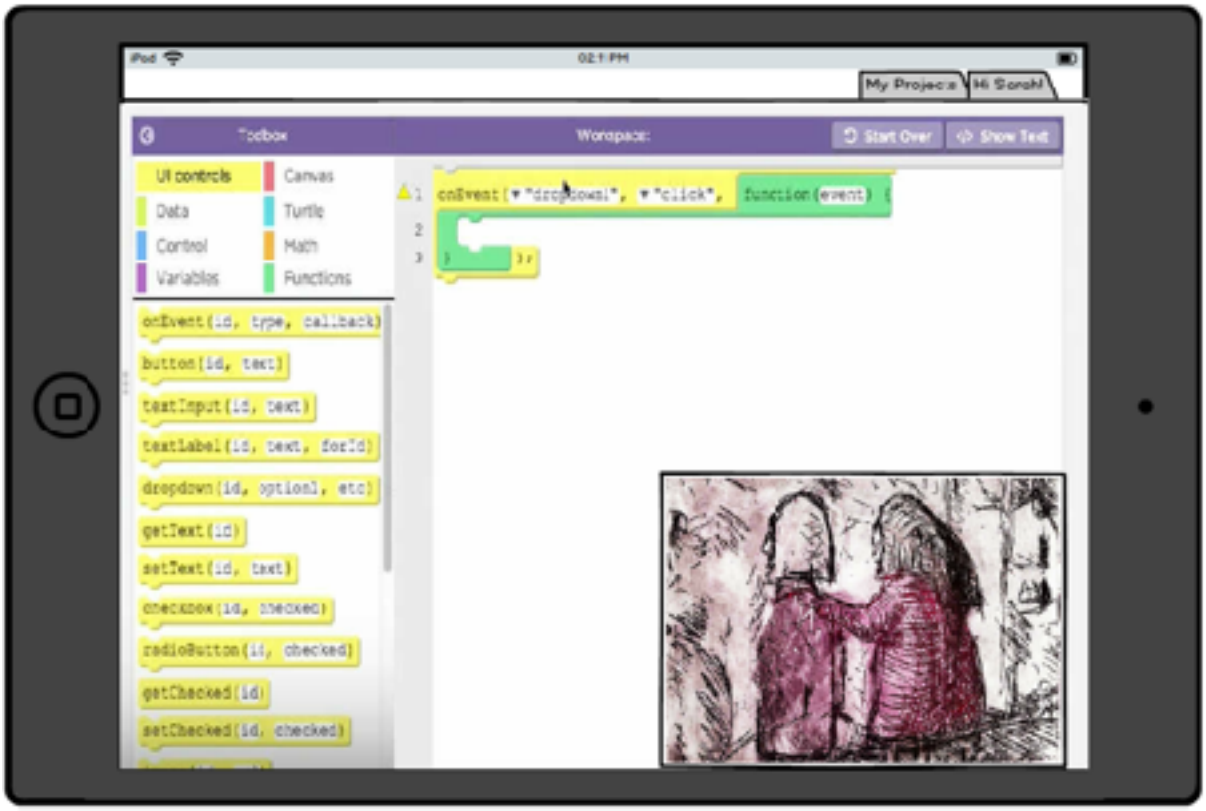
There is some interesting work undertaken with using machine learning to create images which are more dream-like 'animations' between two start and end points. The code synthesizes preferred inputs for neurons in neural networks via deep generator networks (Nguyen, A. et. al, 2016).

https://github.com/Evolving-AI-Lab/synthesizing

Money Making: Subscription based revenue.

Incentives:
Purchasing a year's subscription at 20-50% discount, versus a monthly debit from a credit or debit card. Bulk subscription targeting schools and child-care centers.

Social Equity:
Learners obtain discounts by signing other on board. Schools can buy in bulk, with price inversely proportional to the Schools Educational Disadvantage Index. Consequently, the schools with the highest educational disadvantage will be the best price. A buy-one-give-one option will enable those with finances to give to others that are socio-economically disadvantaged. The worst schools with an index of 1 will be targeted with funding and scholarships, representing 2-10% of the company earnings. This can be administered by a separate charity registered nationally. Possible collaboration with existing charities such as The Smith Family.



5. **Website URL** If applicable.

www.littlegeeklet.com

6. **Why are you the right person/team to solve this problem?**

What insight / experience / advantage do you have? Why do you want to solve this problem? How long have you been thinking about / working on this idea?

Idea: have been thinking about the idea for a number of years. Preliminary traction obtained, but focus was on the WIT charity, studies and earning money to support myself.

Motivation: I have always been looking for a way to combine visual art and sciences. I love stories and find children's books to be magical. I also love learning, and would like to continue to challenge myself in this area. I think Entrepreneurship might provide flexibility in lifestyle, allowing myself to be a Business person, Visual Artist, and Machine Learning Engineer.

Experience:

Minority - Personal experience as gender and socio-economic minority within programming, mathematics and entrepreneurship.

Teaching – started teaching mathematics at age 17 in year 11 to an adult colleague who was in my class. Continued private teaching in mathematics and computing from year 8 until 3rd year University. I have taught at University since second year in my studies, covering 1st year to Masters in mathematics and computing. I have taught on and off based on performance for a number of decades.

Startup - Founding Director for a charity for 10 years, supporting women in IT within University Education (Girl Geek Coffees, see Catherine Eibner).

Small Business - Massage business for 4 years. Building client base from scratch, to booked out sessions 2 weeks in advance. Strong referrals three persons removed.

Entrepreneurship Awards – Microsoft Australian Women in IT Community Contributor of the Year Award (1st nationally). Brisbane Lord Majors Budding Entrepreneur Grant (top 2% rank). Professionals Australia Partner Scholarship. ThinkLab incubator and eChallenge via the University of Adelaide.

Giftedness Awards - Hypatia Scholarship for Mathematically Giften Women, Google Anita Borg Scholarship, APA Scholarship, Golden Key Society.

Education:

PhD studies in computer science and applied mathematics (complex systems & interactive visualisation).

Master of Design (Visual Art), UNISA – currently studying

Master of Data Science, UNISA – currently studying

Master of Entrepreneurship – paused. Certificate level.

B. Information Technology (1st Hons), double major in mathematics & computing

Advanced Diploma of Business

7. **Tell us why you believe your idea will be successful**

Why is now the right time for this? What have you done to validate your idea? Who are your main competitors and how is your idea different to theirs?

Within Entrepreneurship it is never clear what the "right" time is, only a good or reasonable timing. There is currently a market gap for teaching coding to kids in Australia. In particular, there is a gap for teaching coding through children's stories exists within Australia and would seem to be world-wide.

The idea has been validated through a public stall in Adelaide as part of the eChallenge. A Business Model Canvas has been created and refined iteratively. The references below also indicate the support for story coding (Bell, T., 2015; Smith, S. and Burrow, L.E., 2016; Brodnik, A. and Vahrenhold, J. eds., 2015.; Brodnik, A. and Tort, F. (2016)

There are online options for learning coding specifically for children, which can be accessed anywhere in the world, for example Scratch. This assumes self-directed learning. There are also coding clubs, which deliver quality solutions, so long as these are physically accessible and have sufficient trained unpaid volunteers. Examples include Code Club Australia, Grok Learning and Girls Programming Network. However, these rely on volunteers to assist with teaching and as such are location based. Larger states, higher socio-economic backgrounds, or existing structures such as schools are favored.

Many teaching to code strategies emphasize a game based approach. This may or may not engage females, who can be attuned to the social application of STEM. Frequently female choice of STEM is influenced at an early age such as Primary School, within the context of a role play social narrative. Examples of quality programs include Scratch, Scratch Jr, CoderDojo, and Code Club Australia.

There aren't any solutions to learn coding which directly intersect children's book illustrations with learning coding. Any learning to code books which include an imaginative narrative component are static print, and few if any are based on pictorial learning. Children's narrative coding books include the physical copy of

Hello Ruby. In particular, there isn't the option to create your own narrative or illustrations, in conjunction with a coding learning objective.

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8. **What is an impressive or interesting thing we should know about you?** How do you think that will help you in this venture?

I am a Visual Artist, Data Scientist and Entrepreneur, showing capabilities in the left and right side of the brain. I am curating and exhibiting at Light Square Gallery in April/ May of 2020, along with other artists which intersect art and science from a computational perspective. There aren't many Visual Artists that can undertake Machine Learning.

www.miriamhochwald.com

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9. **About the co-founding team**

a. What's your history, e.g. how long have you worked together, describe the working relationship

b. What's an impressive thing you've done together? Tell us a bit about that experience.

1 female Founder owning 100% of equity in Little Geeklet Pty Ltd.

6 student or early career volunteers, with a time commitment of 4-20 hours each per week.

In total there are 3 females and 4 males, representing over 30% females. This is the "magic" number where females become people, rather than a gender representation.

Little Geeklet Founder Miriam Hochwald has experience in startups by being the Founding Director of the Charity Girl Geek Coffees. At the time this was established 10 years ago in 2009, there was only one support group for WIT University students. Now there are groups in every major University in Australia and New Zealand, on account of the GGC grass roots movement. The work of GGC earned the national award of Microsoft Women in IT Community Contributor of the Year, and assisted to inspire and support a number of other startups such as Tech Girls are Superheroes, which have gone onto win awards of their own.

There are presently 6 students eager to contribute towards Little Geeklet. These are new volunteers and we have undertaken one meeting, as of 23rd of April 2019. All the volunteers are or have studied undergraduate and Masters degrees, with a number having multiple qualifications.

Name	Gender	Role	Skills	Education Level
Trong Tam Dang (Tommy)	M	Interaction Design	Arts, Python, Java, Web Development, Content Writing	(2019 onwards) B. Information Technology (Games & Entertainment Design), Diploma IT (2018)

Giao Tran	F	Interaction Design/ Designer	Graphic/ editorial design, illustration, Filming and editing, art	Current: Bachelor of Communica on and Media (submajor in Digital Media); Bachelor of International Business
Laura McLeod	F	Business	Project Management, Administration, Graphic Design	Bachelor Design (Visual Communication); Diploma Leadership & Management
Keith Moc	M	IT Architecture	Mobile Development (Android, iOS), back-end application development, Amazon Web Server	(Feb 2019 to end 2020) M. Software Engineering, MSc. Computer Science and Information Engineering, BSc. Computing
Kuang Kao	M	Project Management	Project Management, Data Science, Translating between technical and non-technical persons	Physics Degree
Son Dong Nguyen (Peter)	M	Economist	B. Business (International Business)	4 hours a week

10. How much time per week can you commit during the Accelerator?

100% time for the Founder. Between 4-20 hours weekly per volunteer.

11. Is there anything else you would like to add or think we should know?

Founder Miriam Hochwald shows tenancy and resilience. She was educated in a Primary and High School with the highest educational disadvantage ranking in South Australia and lived in the highest crime suburb. She left home at age 16, putting herself through year 11 and 12, then University of her own back and finances. Neither her father or mother had finished High School. After failing year 10 and 11 due to family breakup, she eventually took out the top 1% Tertiary Entrance Rank with perfect or near perfect scores in Mathematics and Visual Art. Failing mathematics in year 11 she was not going to be put up to year 12 mathematics, or perhaps only allocated a remedial mathematics class. After

leaving home she employed a mathematics and physics tutor out of her food money, whilst living at half the poverty line. During this process she was assessed to be mathematically gifted. She was awarded one of three scholarships in the state, called the Hypatia Scholarship for Mathematically Gifted Women. Despite living below the poverty line and not owning a computer, Miriam went onto the level of PhD studies in mathematics and computing, being accepted into numerous institutions around the country. During her journey she has continued to assist others, such as being a student Equity representative and creating a national charity to address reasonable support for Women studying IT at University. She remembers and is thankful for those that helped her along the way.

12. Founder Details - We need these for all founders (a. to e. are required)

a. First Name
: Miriam

b. Last Name
: Hochwald

d. Phone Number: 0412020079

f. Pronoun preference: hers, theirs

g. Nationality: Australian

h. Ethnicity: Australian-Dutch-German

j. LinkedIn URL: https://www.linkedin.com/in/miriamhochwald/