

KIDSGOCODE™

PYTHON & MATH SYLLABUS

REGULAR CLASSES

What is Python?



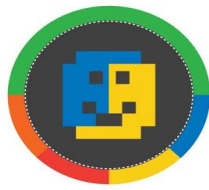
Python is an easy to learn programming language. You can use it to create web apps, games, even a search engine! Now 8 out of 10 universities in USA are teaching Python at first semester! Many primary schools in USA, UK, Canada, Australia, Estonia, and India already started to teach computer programming as a compulsory course in their curriculum using Python programming language.

YouTube, Pinterest, Instagram, and many other famous online applications are created by Python. NASA, CERN and many other scientific teams are using Python! Also the main official programming language in Google is Python! Python is easy to learn and this makes it the best choice for children to step into the world of computer programming to improve their computational thinking abilities! Computer programming is not anymore a privilege, regardless of our children future career, they have to know how to code and program.

Blockly Programming



We are using one of the best approach to teach programming for kids in a very interactive and effective way! This method is called "Blockly". Blockly is made by Google which is a special collection of online Blockly Games that are built as playful ways to engage children in their first efforts at programming, and the search giant wants parents to help build the interest of their children., even top universities teach block-based coding (e.g., Berkeley, Harvard).



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What is our main contribution?

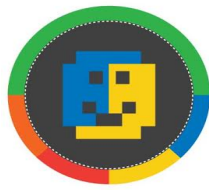
- We provide easy learning technique in Math & Problem Solving and Computational Thinking abilities
- Using Graphics and Game to make it interesting for children (Turtle and PyGame)
- We are using Blockly, which is the best and a state-of-the-art approach to teach programming, created by Google, supported by MIT, Berkeley, and Harvard!
- We have unplugged approaches focused on theoretical part of Computer Science, Math, and History of Science but in a very interactive way! Like Binary number or cryptography.

What is our teaching plan?



Our step-by-step explanations will have kids learning computational thinking right away, while visual and game-oriented examples hold their attention. Friendly introductions to fundamental programming concepts such as variables, loops, and functions will help even the youngest programmers build the skills they need to make their own cool games and applications.

At the same time we focus a lot on Mathematics and flavor most of our example with mathematical practices to achieve two goals within one way, problem solving and computational thinking abilities.



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Our Learning Cycle

Week 1 – Hour of Code! Teaching Python, Turtle, and Geometry

Computational Thinking, Problem Solving, and Logic

Week 2 – Unplugged Day! Math, Algorithm, and History of Science

Theoretical part of Computer Science, Teamwork, and fun!

We use an approach focused on theoretical part of Computer Science as well as Mathematics.

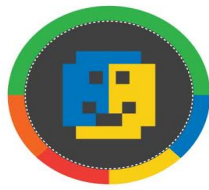
Week 3 – Tutorial Class! Dozens of practices to improve students' skills!

Amazing practices from math, physics, and astronomy!

Week 4 – Inspiration Week! A real-life project for motivation!

A great answer for "*Why should I learn Math?*"

In this week we learn different topics from Mobile App Development, Website Design, Electronic and Robotics, and Game Programming.



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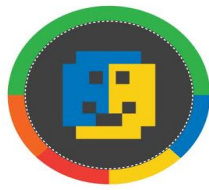
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Isn't beautiful? Well, it is created by 11 years old girl using Python Turtle!! Turtle graphics is a popular way for introducing programming to kids. It was part of the original Logo programming language developed by Wally Feurzig and Seymour Papert in 1966. The young ones are fascinated by visually appealing designs rather than text.

We are using Turtle Graphic and PyGame. With the following syllabuses we make programming more fun and interesting for children at the same time making them engaged with Geometry and mathematical calculation following the **IGCSE syllabus**:

- I. Number**
- II. Algebra and Graphs**
- III. Geometry**
- IV. Mensuration**
- V. Co-ordinate Geometry**
- VI. Trigonometry**
- VII. Matrices and Transformations**
- VIII. Probability**
- IX. Statistics**

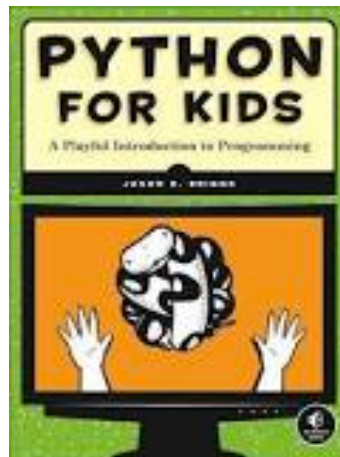


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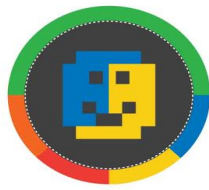
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Book

Python for Kids: A Playful Introduction to Programming
by Jason R. Briggs

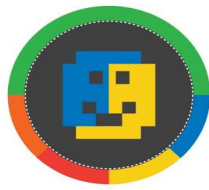


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TOPICS	IGCSE SYLLABUS
<p>Variables, expressions, and statements</p> <p>Variables are part of the memory to keep data. Students will learn how to use variables to create mathematical expressions and formulas to form algorithm.</p>	<p>I. Number II. Algebra and Graphs III. Geometry</p>
<p>Hello, little turtles!</p> <p>Turtle is a beloved friend used to teach Geometry in a form of computer graphics! Getting familiar with all of its abilities will enable students to draw beautiful geo-flowers, understand Trigonometry, learn Pythagorean theorem, and many more!</p>	<p>I. Number II. Algebra and Graphs III. Geometry V. Co-ordinate Geometry</p>
<p>Iteration</p> <p>Computers are good in repeating things. Huge applications are formed from building bigger constructions by repeating blocks of codes again and again. Example is sending 10,000 of emails to users or checking 10,000 bank customer accounts. All of them are possible only using iteration. At this stage, students will learn how to use the importance of counter loop and conditional loop.</p>	<p>I. Number II. Algebra and Graphs III. Geometry IV. Mensuration V. Co-ordinate Geometry</p>
<p>Functions</p> <p>Wrap it up! When a code becomes bigger and bigger then Many places are doing a similar thing with minor</p>	<p>I. Number II. Algebra and Graphs III. Geometry IV. Mensuration V. Co-ordinate Geometry</p>



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<p>difference in their values. In Computer Science, “decomposition” is a key of computational thinking. It is breaking a problem into smaller and repeatable problem which are easier to tackle. It will then be the time for “Pattern Matching” which is finding similarity between all the blocks and taking out different things to form the next phase called Abstraction. Abstraction is a general form of all those detected similarities that eventually will be formed into Algorithm. Choosing a name for the Algorithm and shaping it into a Function happens in this phase. This gives reusability for the application. Students will learn how to create functions, decrease their code sizes, and make it more readable.</p>	
<p>Conditionals</p> <p>Left or Right? Make a decision! Making decisions happen every day and every where! Imagine an air condition which is set to not allow the temperature to exceed 23°C. If programmed to “YES” air condition will start to work and bring the temperature down. This is done in computer programming all the time. For instance, a web site and the user is going to sign in into an account that needs a user name and password. The system will then have to check whether the user name and password is correct or not. If it is not correct, the system is programmed stop the access in the account. A decision is based on the given user name and password. In this stage, students will learn how to use “IF” structure to guide the computer in making a decision based on the coming data.</p>	<ol style="list-style-type: none">I. NumberII. Algebra and GraphsIII. GeometryIV. MensurationV. Co-ordinate Geometry
<p>Strings</p> <p>Most of the online digital data is in the form of text. Strings are purposed to help store textual data in a form of letters and symbols. Examples of strings are welcome message, error message, or giving instructions to users to click a button. In this stage, students will focus on developing their understanding on Strings in programming.</p>	<ol style="list-style-type: none">I. NumberII. Algebra and GraphsIII. GeometryIV. MensurationV. Co-ordinate GeometryVI. Trigonometry
<p>Data Structures (List, Tuples, Dictionary, Set)</p> <p>Every shopping mall have their own way of organizing things. They use different coding to help customers find items they are interested in. In computer programming,</p>	<ol style="list-style-type: none">I. NumberII. Algebra and GraphsIII. GeometryIV. MensurationV. Co-ordinate Geometry



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<p>storing a data in the memory in a specific kind of way is called data structure. For instance, finding the average grade of 100 students and sorting them by their grade. Students' grades should be read in database and loaded into the memory in the best way of sorting, calculation, and searching. In this stage, students will get familiar with different approaches such as list, tuples, dictionary, and set. Students will need to remember that after finding their algorithm, the next step is thinking of the best data structure to implement for that algorithm.</p>	VII. Matrices and Transformations
<p>Event Handling</p> <p>We are all leaving in the world of events! Using a doorbell is actually raising an event for to notify the person's presence. Another example is putting a food in a microwave for 1 minute where a person should wait until microwave says BEEP. That beep sound is an event forcing the person to take an action. In computer programming, especially when making a graphical user interface or a game, all the events should be taken cared of all the time! For example, when a person presses and button, the code should manage the proper response like clicking the close button to close and application. In this chapter, the students will learn the different types of events and how to provide proper responses.</p>	I. Number II. Algebra and Graphs III. Geometry IV. Mensuration V. Co-ordinate Geometry VIII. Probability IX. Statistics
<p>Files and Databases</p> <p>Store a data before losing them! Any computer or mobile application needs a storage to keep its own data. For example, Facebook has more than 1 billion users and these users carry huge amount of data about themselves. Now Facebook must be able to save their data permanently. In this chapter, students will learn how to create permanent files for their application, how retrieve stored information from their file, and eventually learn to build your their database.</p>	I. Number II. Algebra and Graphs III. Geometry IV. Mensuration V. Co-ordinate Geometry
<p>Exceptions</p> <p>You can't run away from bugs! All the time, even the best companies, face the bugs in their application. But there are different approaches to manage all possible raised errors and exception. In this chapter, students will see how we manage the bugs provide proper solution.</p>	I. Number II. Algebra and Graphs III. Geometry IV. Mensuration V. Co-ordinate Geometry



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<p>Imagine using a calculator and divide 5 by 0, an undefined in math, which will cause an error. Students will learn how to detect a bug like this and avoid crashing their application.</p>	
<p>Classes and Objects</p> <p>The way of managing and organizing programming blocks is called Object Oriented. This is great in avoiding huge amount of messy codes! But in industrial level with many programmers working at the same project, a strong foundation is needed to make sure that a project will not be broken. Students will learn in this chapter a lot of things like data encapsulation, information hiding, inheritance, and polymorphism preparing them to be ready to build a great game.</p>	<ol style="list-style-type: none">I. NumberII. Algebra and GraphsIII. GeometryIV. MensurationV. Co-ordinate Geometry
<p>PyGame</p> <p>At this stage, we challenge the students' knowledge to build several amazing games using a famous game engine called PyGame. They will create their own characters, sounds, images, and will see how they start to work and dance together.</p>	<ol style="list-style-type: none">I. NumberII. Algebra and GraphsIII. GeometryIV. MensurationV. Co-ordinate Geometry
<p>And many more!</p> <p>Additional topics and chapters will be added as classes progress.</p>	