**Activity Safety Form**

|  |  |
| --- | --- |
| **Program:** | jrDEEP Summer Academy |
| **Course Title:** | Cool Code |
| **Instructor(s):** | Connor Smith, Anastasiya Martyts |
| **Season:** | Summer |
| **Year:** | 2014 |
| **Project/Activity Name:** | The Turtle |
| **Source:** |  |
| **Grade Level:** | 5-6 |
| **Topics Covered By Activity:** | Intro to the Python turtle (a graphics module) |
| **Objective (Learning Outcomes):** | This activity is meant to familiarize students with the turtle – a very simple and easy to learn graphics tool in Python that can be used to generate images. |
| **Safety Approval Date:** |  |

Please identify specific safety hazards in the table below

|  |  |  |
| --- | --- | --- |
| **Check if applicable** | **Hazard** | **Why is this required?** |
| x | Electricity | To run R­­aspberry PIs |
|  | Open Flame |  |
|  | Projectiles |  |
|  | Natural Gas |  |
|  | Compressed Air |  |
|  | Glassware |  |
|  | Dissection Equipment |  |
|  | Biological Material/Specimen |  |
|  | Chemicals |  |
|  | Tools (ex. soldering iron, hacksaw, drill)  **Please specify in the materials list** |  |
|  | Other: |  |

Safety Materials/P.P.E. Required for this Activity

|  |  |  |
| --- | --- | --- |
| **Check if Required** | **Safety Material/Personal Protective Equipment (P.P.E.)** | **Explanation (Specify when this is required i.e. is this during preparation and/or while the activity is taking place and who wears/uses the piece of P.P.E. i.e. Instructor, student etc. please be explicit)** |
|  | Goggles |  |
|  | Lab Coats |  |
|  | Nitrile Gloves |  |
|  | Table Coverings |  |
|  | Fume hoods |  |
|  | Biosafety Cabinets |  |
|  | Spill Kits |  |
|  | Disposal Mechanisms (ex. broken glass, biologics, chemicals) |  |
|  | N95 Masks |  |
|  | Other: |  |

**Background Information:** (Outline any information that would be required to support the activity. Assume the person reading this Activity Write-Up isn’t a specialist on this topic.)

**What is the turtle?**

The python turtle is not a real turtle. It is a module (a collection of functions) that allows you to do simple graphics – i.e. draw stuff! All you need to do in order to access these functions is type “import turtle” at the top of your file. Adding “import math” will be useful too when using the turtle for geometric drawings. The “turtle” itself appears as a small black arrow that can draw on the screen.

**How do you control the turtle?**

You can control the turtle by writing a program made up of very simple commands found in your cheat sheet – the turtle can move in all directions, rotate in all directions, as well as draw in different colours and thicknesses. Just like you would give a person directions on where to walk if you were trying to get them to a place, you tell the turtle how far to go and in which direction in order to draw what you have in mind. It is important to run your code frequently to make sure the turtle is doing what you want it to – and if it isn’t, you can debug much easier along the way rather than after you run the final code, only to see a bunch of random lines appear on the screen (trust me, that is much more confusing to fix!).

**What can I do with the turtle?**

As mentioned previously, you can draw things! While drawing straight lines might not sound too exciting, you can draw many other things with the turtle – such as various mathematical functions and patterns. Some mathematical sets, for instance, can be graphed and produce very interesting patterns called fractals – you can check out one type of fractals by running the fractals.py file on your desktops. We’ll show you a few more cool examples – and give you the code for them if you’d like!

**Preparation:** (Outline any preparation work that must be completed by you and/or anyone else (lab techs, volunteers, etc.) prior to class time. Please be as detailed as possible, and highlight any health and safety protocols to be followed.)

Ensure all students have Raspberry PIs with starter code files on them. Instructors should also print out turtle cheat sheets for each student. (Cheat sheet found at the end of this document)

**Procedure:** (Please detail **all** the steps required to complete this project/activity. State what will be done by instructor(s), counselor(s) i.e. certain steps, entire demonstration, etc. and what will be done by your students. Outline any Safety procedures required due to location/venue of activity.)

1. Try out each of the commands on the cheat sheet provided.
2. Once you are comfortable controlling the turtle, it’s time to draw! Your task is drawing a house. You can start out with a simple rectangular house and make it as complicated as you want. We (the instructors) will be checking out the houses at the end, as well as helping you guys along the way.

**Diagrams or any supplemental information (attach/embed if applicable):**

**Curriculum Connection (Optional)**

**Additional/Extension Activities & Procedure (if applicable):**

* If some students are finding the activity too easy, you can either introduce them more in depth to fractals and give them some fractals to play around with (by changing parameters) or give them another task – e.g. draw a car in addition to the house.

**Student Take Home/Materials Kept:**

**None**

Materials **(Please include all materials including consumable items, tools, stationery, arts & craft supplies, chemicals, biologics, etc.).** Please identify (in the notes column) any hazardous materials PRODUCED as a result of the project/activity.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Quantity** | **Purpose in Activity** | **Route of Transmission** | **Anticipated Health Risk** | **Safety Precautions** | **Storage/Disposal Arrangements** | **Notes** |
| Raspberry Pi | 1 per student | Programming |  | Tripping on power cords | Cable organization, tape cables to floor if necessary |  |  |

Use the below chart to inform how you fill out various sections of your Activity Safety Sheet.

|  |  |  |  |
| --- | --- | --- | --- |
| Anticipated Health Risks (Use the following relevant descriptions in the materials table) | | Safety Precautions (Use these and other descriptions the show how you will specifically address each of the safety precautions mentioned on the left side of this table.) | |
| 1 | Materials are sharp and may cut skin (Utility Knives, Scalpels, Scissors) | 1 | Instructors will advise on the appropriate use of materials (for 1-10 above) |
| 2 | Materials may poke or pierce skin (Wooden Skewers, Sticks) | 2 | Instructors will review the MSDS for materials prior to and during the activity (3-8) |
| 3 | Materials are toxic if ingested (Chemicals such as Bleach, Detergents, Indicators) | 3 | Participants will wear dust or N95 masks at all times (4 and 5) |
| 4 | Materials are hazardous if inhaled (Chemicals, Powders, Dust, Solder) | 4 | Participants will wear nitrile gloves at all times (6) |
| 5 | Materials are an irritant to lungs (Chemicals, Powders, Dust) | 5 | Participants will wear goggles at all times (7) |
| 6 | Materials are an irritant to skin (Chemicals, some Soaps, Allergens) | 6 | Students will be instructed on the use of the eye station in-lab (7) |
| 7 | Materials are an irritant to eyes (Chemicals, Powders, Dust) | 7 | Instructors will have a fire extinguisher within arm’s reach while performing activity (8) |
| 8 | Materials are flammable/Use of Open Flame (Alcohol, Gases, Fuels, Matches) | 8 | Instructors will establish a safety perimeter of 5m while performing the activity/during testing (8 and 10) |
| 9 | Participants may present serious allergies (Nuts, Shellfish, Milk, Eggs, Fruits, Food Colouring) | 9 | Instructors will review student allergies prior to commencing activity (9) |
| 10 | Materials are or can be involved as projectiles (Rocks, Golf Balls, Rockets) | 10 | Instructors will advise of any hidden allergens (9) |
| 11 | Materials present a slipping hazard if spilled | 11 | Instructors will monitor participants for indications of an allergic reaction (9) |
| 12 | Materials are hot and may burn skin. (glue guns, soldering irons) | 12 | Instructors will review the procedure with students, prior to testing (1-10) |
|  |  | 13 | Instructors will explain any necessary emergency protocol (always) |
|  |  | 14 | Instructors will debrief and discuss any sensitive issues before, during and after the activity (always) |
|  |  | 15 | Only Instructors with training will complete the specified activity or demo always. |
|  |  | 16 | Spill Clean up kit provided (11) |
| Routes of Transmission | | Questions to ask about your Materials and Activity (Address any that are relevant in your above Activity Safety Sheet) | |
| 1 | Eyes | 1 | Are there any ethical concerns regarding your workshop? |
| 2 | Skin contact | 2 | Are there any sensitive issues or activities? |
| 3 | Inhalation | 3 | Are there safety concerns if specific procedures are not followed? |
| 4 | Ingestion | 4 | Do any of the materials have an MSDS? |
| 5 | Other (please specify) | 5 | Do any of the materials or activities require special training? |
|  |  | 6 | Questions to ask about your Materials and Activity (Address any that are relevant in your above Activity Safety Sheet) |

Python Turtle Cheat Sheet

|  |  |
| --- | --- |
| *Get started* | **import** turtle |
| *Draw a line 100 pixels long* | turtle.forward(100)  turtle.back(100) |
| *Change direction, right or left, by 90 degrees* | turtle.right(90)  turtle.left(90) |
| *Draw a circle of radius 50 pixels* | turtle.circle(50) |
| *Draw a semi-circle of radius 50 pixels* | turtle.circle(50, 180) |
| *Change the colour* | turtle.pencolour(“blue”) |
| *Change the pen size to 10 pixels thick* | turtle.pensize(10) |
| *Erase everything and start over* | turtle.reset() |
| *Send the turtle to the center of the screen (its original starting point)* | turtle.home() |
| *Move the turtle without drawing* | turtle.penup() |
| *Resume drawing when the turtle moves* | turtle.pendown() |
| *Make the turtle draw faster* | turtle.delay(0) |
| *Make the turtle draw slower* | turtle.delay(1000) |