IIT Bombay

Computer Programming

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Session: Elementary Graphics
Guest Lecturer: Dr. Abhiram Ranade

Elementary Graphics

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This is what we study in the next few sessions...

Outline of this session

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- Introduction to our graphics package, Simplecpp
- Turtle graphics

Introduction

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Two kinds of graphics supported

- Turtle graphics
- Co-ordinate based graphics

Turtle Graphics

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Has a pen, which draws on the screen as the turtle moves.

Goal of turtle graphics: Draw interesting pictures on the screen.

A simple program fragment

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```
turtleSim();  // Start turtle graphics
              // Turtle appears at the center.

forward(100); // Move forward 100 pixels.
right(90);    // Turn right 90 degrees.

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What does this draw? Pretend you are the turtle!

The full program

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```
#include <simplecpp>
int main(){
  turtleSim();
  forward(100); wait(0.5); right(90); wait(0.5);
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- `#include <simplecpp>`: This causes graphics functionality to be included.
- `wait`: This causes the program to wait for the specified number of seconds.
  If we dont put in `wait` statements, the execution will happen too fast and we will not see anything.

Demonstration

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Functions to command the turtle

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- `penDown()` The pain is lowered. Drawing resumes.
- `wait(double S)` Wait for `S` seconds.

Demo: drawing a decorative plate border

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Make the drawing graceful, e.g. there should be no sharp corners.

Demo: Drawing a tree

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Key observation: A tree can be viewed as a trunk, on top of which are two trees, at an angle.

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We develop this next. Something similar is discussed in Chapter 10 of the book.

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  You have to figure out the symmetry and represent it suitably in your code.
- Iterative symmetry: Same pattern is repeated, e.g. decorative plate.
- Recursive symmetry: Part of the picture is similar to the whole, e.g. tree.
- Drawing highly patterned pictures, where you can supply parameters to change the amount of iteration or recursion can be a challenging project.