CS 101: Computer Programming and Utilization

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(Abhiram Ranade's slides, borrowed and edited)

Lecture 2

This Lecture

- Some more S++/C++ commands and features
- Coding convention and terminology
- Spirit of the course

Some commands for today

- repeat()
- cout and cin
- Variables
- S++ commands: left(), penUp(), penDown()

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General remarks about C++ programs

- Program = sequence of statements/commands.

`main_program{... written here ...}`

- Statement/command: terminated by ";"
- Commands are executed from top to bottom, left to right.
- Arguments: additional data needed by command to do its work.
  - `forward`: how much forward?
  - `right`: what angle?
  - () if no arguments, e.g. `turtleSim`()

Language syntax

- Syntax = grammatical rules indicating how commands must be written.
- Syntax of programming languages is very strict, e.g.
  - “right(90);” cannot be written as “right 90;”.
  - “penUp()” cannot be written as “penup()” or “penUp”, i.e. without parentheses.
  - We will later learn other kinds of statements which will have their own syntax which must be adhered to.
- Lot of flexibility is still allowed, e.g.
  - Wherever a number is acceptable, often an ”expression” such as 360/n is acceptable
  - repeat statement is allowed wherever other statements are allowed, e.g. we can have a repeat inside another repeat.

Comments

- A program will be executed on a computer, but it will also be read by people.
- Sometimes readers may not understand why the program is written the way it is written.
- To help such human readers, you can place “comments” in your program.
  - Anything placed between /* and */ is a comment
  - Anything between // and end of line is a comment
  - A comment is meant only for human readers and is ignored by the computer during execution.

Indentation

```
#include <simplecpp>
main_program{
  turtleSim();
  cout << “How many sides?”;
  int nsides; cin >> nsides;
  repeat(nsides){
    forward(100);
    right(360.0/nsides);
  }
  wait(10);
}
```

Some commonly used terminology

- "Control is at statement w": Computer is currently executing statement w.
- "Control flow": The order in which statements get executed.
  - Execution starts at top and goes down. Retraced if there is a repeat statement.
- Variable: region of memory designated for storing some value you need
  - Example: `nsides` which we saw earlier.
  - Named so because the value stored in the region can vary
  - How to change the value: later.

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Spirit of the course

- Learn C++ statements/concepts.
  - We have already covered a lot of ground, even if it doesn't seem so.
- Understand patterns in the calculations that you want to do
  - Very important in all programming, not just drawing.
- Goal: if you can solve a problem by hand, possibly taking an enormous amount of time, by the end of the book, you should be able to write a program for it.
- Learn new ways of solving problems!

Spirit of the course 2

- Do not be afraid of using the computer.
- “What if I write `xyz` in my program instead of `pqr`?” : Just do so and find out.
  - Be adventurous.
- Exercise your knowledge by writing programs – that is the real test.

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