Computer Science 227
Introduction to Programming

Iowa State University

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Recap

- print, println
- Data has type. Use variables to represent data. Variables have type int, double, char
- Variable declaration, assignment statements
  ```java
  int currentYear, currentYear = 2011
  ```
- Arithmetic operators and expressions
  - currentYear - birthYear
  - (finalReading - initialReading)/gallons
Typing Speed

The razor-toothed piranhas of the genera Serrasalmus and Pygocentrus are the most ferocious freshwater fish in the world. In reality, they seldom attack a human.
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```c
int numberOfCharacters;
int time;
double speed = numberOfCharacters/time;
```
Division

Integer Division Vs Real Number division
5/2 = 2
5/2.0 = 2.5

Division Rule
Both operands are of type int (or short, byte, long) → Integer Division.
At least one operand is of type double or (float) → normal division.

Modulus
Remainder. 5 % 2 = 1
double speed = ((double) numOfCharacters/time);
(double) numOfCharacters is of type double
(double) time is of type double
Too Many Pennies

Program to convert pennies into quarters, dimes, nickels.

eg: 42 pennies: 1 Quarter, 1 dimes, 1 Nickel, 2 pennies
Distance

Straight Line Distance (Cow Path Distance) between two points \((x_1, y_1)\) and \((x_2, y_2)\).

\[
\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}
\]

Manhattan Distance:

\[
|x_1 - x_2| + |y_1 - y_2|
\]

Program to compare Straight Line Vs Manhattan Distance
final int PENNIES_PER_QUARTER = 25;
final double PI = 3.14;
Use final to declare a constant.
PI = 3.145 —Invalid statement
Practice Problems

- Write an arithmetic expression to calculate your final numeric grade (from grades in Labs, HW, and exams).
- Write a program to calculate area of a circle given a given radius.
- Write a program to convert seconds into Hours, Minutes and seconds. For example, 3700 seconds is 1 hour 1 minute 40 seconds.
- Write a program to calculate number of leap years between a 2000 and a givenYear. For example, if givenYear is 2011, then you answer is 3. You do not have to use, *if* statements or *loops* to do this. Btw, 3000 is *not* a leap year. See http://www.support.microsoft.com/kb/214019 on how to determine whether a year is leap year.