Content Objective: Students will explore various data types and arithmetic operations.

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| **On the Tech Horizon (10pts.)**  **link to a tech/coding related article or journal no more than one month old (no blogs or reddit clones see below)** | |
| URL: |  |
| Reaction/Commentary: |  |

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| **Tech Terms and History (20pts.)**  **vocabulary from BJ p.131-p.178 and The Information Chapter 3 (definition/commentary/significance in your words)** | |
| List Primitive Data Types by their Size | Boolean/Byte 1  Short/Char 2  Int/Float 4  Double/Long 8 |
| Number Literal | A plain value such as 5 or .321 |
| Overflow | When the value of a variable exceeds the maximum value |
| Roundoff Errors | Numbers will lose precision because there are only 7 significant digits. |
| Numeric Constant (syntax) | Values that do not ever change |
| BigInteger (details) | Class used to have no limits on number values. Cant use operators, has to use methods |
| Magic Numbers | Constant that appears in the code without explanation |
| List and describe as many programmatic operators as you can: | / division () everything inside is computed first ++ adds 1 -- subtracts 1 % gives remainder  Math.pow(x,n)= x^n Math.sqrt() Math.sin(x) Math.cos(x) Math.tan(x) Math.round(x) Math.ceil(x) Math.toRadians(x) |
| Powers in Java (syntax) | Math.pow(number,exponent); |
| Remainder/Modulus (syntax) | 13%4 |
| Integer Division (explain) | 7/4 =4 remainder is discarded |
| Casting (Converting) Syntax | Double balance = 5 ;  Int dollars = (int) balance;  Math.round |
| List all Incrementing Operators | ++ adds 1 -- subtracts 1 |
| Explain Floating Point Bug | Very few floating point equations would turn up the wrong result, but it was very unlikely, and only would happen once in 27,000 years to typical people |
| printf and % | Printing multiple values in a single call  %d used with an integer  %5d field width is 5  %f used with a floating point number  &.2f prints 2 digits after decimal point  &s used with string |
| Concatenation | Adding strings together using the + operator |
| String Literals | Characters enclosed in the quotes |
| Escape Sequence | Backslash (\) is used to add quotations marks to a string. \n is new line. \\ adds a backslash |
| Substring (syntax) | Str.substring(start,pastEnd). Strings start with the first letter as 0 |
| Cawdrey’s Contribution | Collected and published words into books like no one else had before. |
| What is a recursive procedure | A binary decision of greater than or less than |
| Erya and how it worked | Dictionary that arranged entries by meaning |
| OED 1st had what? | 10 huge volumes of dictionary |

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| **Code Snippets (30pts.)**  **only submit snippets or classes no full programs required (test and run in IDE, then copy/paste applicable code frag)** | |
| R4.1, R4.5, R4.12, R4.18 | R4.1  int days = 7;  int daysTilEndOfSemester;  double cmInInch = 2.54;  double tallest;  R4.5  System.out.println("Position at t= " + t + " " + s);  double G = 4\*Math.pow(Math.PI,2)\* ( (Math.pow(a,3))/ ((Math.pow(p,2))\*(m1+m2) ));  double FV = PV\*Math.pow(1+(INT/100),YRS);  double c = Math.sqrt(Math.pow(A,2)+Math.pow(B,2)-2\*A\*B\*Math.cos(angle));  R4.12  2 is an int, 2.0 is a float, ‘2’ is a char, “2” and “2.0” are strings  R4.18  double r1;  double r2;  double h;  System.out.println((Math.PI\*((r1\*r1+r1\*r2+r2\*r2) \*h))/3); |
| E4.3, E4.8, E4.12, E4.15, E4.18, | E4.3  Scanner keyboard = new Scanner(System.in);  double number = keyboard.nextDouble();  double squared = Math.pow(number,2);  double cubed = Math.pow(number,3);  double fourthed = Math.pow(number,4);  System.out.println(squared + cubed + fourthed);  E4.8  Scanner keyboard = new Scanner(System.in);    double side1 = keyboard.nextDouble();  double side2 = keyboard.nextDouble();  double area = side1\*side2;  double perimeter = side1\*2 + side2\*2;  double diagonal = Math.sqrt(Math.pow(side1,2)+Math.pow(side2,2));  System.out.println(area +" "+ perimeter +" "+ diagonal);  E4.12  Scanner keyboard = new Scanner(System.in);    String number = keyboard.nextLine();  number = number.replace(",","");  System.out.println(number);  E4.15 |

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| **Code Challenge (30pts.)**  **full functioning application sent in a Zip file to Canvas** | |
| Using programming projects from chapter 4 (BJ p.171-176), students may choose **one** of the following challenges P4.2, P4.8, P4.11-16. Please include Javadoc comments for all classes, member variables, constructors, methods etc… (no html file is needed.) | |
| Zip File Contains: | ChangeMaker.java (P4.8) |
| Notes: |  |

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| **Badge Progress (10pts.)**  **building your coding profile: Java coding training site to earn badges (recommended site** [**http://coderbyte.com**](http://coderbyte.com) **)** | |
| Screenshot/URL: |  |
| Notes/Issues: |  |

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| **Notes**  **your notes** | |
| Notes: | .length()  .equals()  .charAt()  .substring()  .toString()  .compareTo()  .contains() |