

CS 1401, Exam #1, MW 9-10:20 version**Date:** Wednesday, September 18, 2013**Name** (please type legibly, ideally in block letters):

Arturo Ortiz

1-6

$$\frac{59}{60} = \frac{98}{100}$$

1. On September 18, 1793, the first cornerstone for the Capitol building was laid by George Washington. Once the building was built, this became a place where the results of US censuses were reported and discussed.

- Explain what Hollerith did to help process the census results, and how this promoted computations in general.
- Name US researchers who pioneered the design of modern computers, briefly explain their contributions.

$$\frac{1043}{10}$$

For extra credit: describe one more event from the history of computing.

- Hollerith helped compute the census results much faster with the use of punchcards
- "Atanasoff Berry Computer" first computer built by Professor Atanasoff "ABC" and by his student Berry.
- John Napier invented logarithms
- Franco viete invented the use of variables to describe numbers
- Ada Byron first computer programmer
- Egyptians using Geometry to locate the boundaries of the Nile river.
- The invention of "0" in india during the middle age.

2. For each of the following sequences of symbols, describe which can be valid Java identifiers and which cannot be; if you believe they cannot be, briefly explain why (e.g., "is a reserved word" or "does not start with a letter"):

- 9-10:20session Not valid (starts with a digit)
- session9-10:20 Not valid (has a \oplus and a \ominus)
- static Not valid (reserved word)
- census valid
- session_9_10_20 valid

10/10

3. One of the reasons for the US census is allocating federal funds, including federal funds for public health. One of the big problems with public health in the US is the increasing fraction of overweight people, in particular, overweight children. Whether a child is overweight or not is determined by the Body Mass Index which is computed as follows:

$$\text{BMI} = \frac{\text{mass (in pounds)}}{(\text{height (in inches)})^2} \times 703$$

Assuming that mass and height are already placed in the corresponding variables of type double, write a Java code statement for assigning the corresponding value to the variable bmi of type double. Explain, step-by-step, which arithmetic operations will be performed first, which next, etc. Explain what happens if you do not use parentheses to describe a denominator.

```
double bmi = (mass / (height * height)) * 703
```

- 1) First Java will multiply the height times the height
- 2) next it will divide the mass by the result in Step 1
- 3) Finally it will multiply the result in step 2 by 703

If you don't use parentheses to describe the denominator Java will do the operations left to right, with multiplication and division on the same level. Therefore Java will divide mass by height and then multiply by height.

18
20

4-5. Suppose that the federal funds provide \$5.00 per resident for public health expenses. Write the main method which asks the user for the name of the county, asks how many people live in the county, and prints a memo describing how much funds will go to the county. For example, if we want to know how much money will go to El Paso County with 800,000 residents, your program should print the following message:

From: U.S. Census Bureau

El Paso County with 800000 residents will get
\$5.00 X 800000 = \$4000000.00.

Declare 5.00 as a constant of type double, so that it will be easy to change if needed.

Reminder: to read from the keyboard, you can define the reader as follows:

```
Scanner reader = new Scanner(System.in);
```

the header of the *main* method is:

```
public static void main(String[] args){
```

```

public static void main (String [] args) {
Scanner reader = new Scanner (System.in);
System.out.println ("Type the name of your county");
String county = reader.nextLine ();
System.out.println ("How many people live in the county");
int people = reader.nextInt ();
final double constant = 5.00;
double amount = ((people * constant) * 100) / 100.00;
System.out.println ("From: U.S. Census Bureau");
System.out.println ("");
System.out.println (county + " County with" + people + " residents" +
" will get \n" + constant + "*" + people +
" = $" + amount + ".");
}

```

8/10

6. Suppose that after graduation, and get a job with the US Census Bureau in Washington, DC. The number of people in El Paso county will thus decrease by 1. If this number of people is stored in two integer variables *people* and *personas*, which of the two lines of code leads to a correct decrease of both values:

- ⁴ `people = personas--;`
- ⁵ `people = --personas;`

people 4 personas 4

← this line of code leads to a correct decrease of both values

If originally, before each line, we had 800,000 people, explain what will happen after each of these lines is implemented by Java. What is a clearer way (different from those above) to decrease the values to the two variables?

```
int people = 800,000;
int personas = 800,000;
people = personas--;
```

799,999
personas

800,000
people

```
int people = 800,000;
int personas = 800,000;
people = --personas;
```

799,999
personas

799,999
people

```
• people = personas - 1;
  or
• personas = people - 1;
```

This will only decrease one of the variables