

1. (6 points) Match each name with the technology they are most closely associated with.

- | | |
|------------------------|----------------------|
| __e__ James Gosling | b. COBOL |
| __b__ Grace Hopper | c. punched cards |
| __g__ Dennis Ritchie | d. FORTRAN |
| __c__ Herman Hollerith | e. Java |
| __d__ John Backus | f. Analytical Engine |
| __f__ Ada Augusta | g. C |

2. (12 points) Short answers.

a) Explain the difference between source code and object code.

Source code is written in a high level language like Java. Source code is meant for communication between humans. Object code is produced by compiling source code. Object code is meant for communicating a program to a machine.

b) What are the two main functions of an operating system?

- 1) To provide an interface for users of the system
- 2) To provide an environment for the execution of programs

c) Give an example of something that might happen during software maintenance.

Adding a feature, correcting a bug...

d) In the context of methods, what is the purpose of parameters?

Methods are for repetitious sections of code. Parameters allow for variation in these repetitions.

3. (15 points) Given the following program, write the output on the lines provided.

```
class Exam1a
{
    public static void main (String[] args)
    {
        Screen theScreen = new Screen();
        Keyboard theKeyboard = new Keyboard();

        double a = 2.5, b = 10.0, c;
        int n = 5, m = 13, p;

        theScreen.println( a * b + m );           //__38.0__
        theScreen.println( m * p );               //__illegal__
        theScreen.println( a / n );               //__0.5__
        theScreen.println( m % 3 );               //__1__
        theScreen.println( a*2 >= n+m );          //__false__
    }
}
```

4. (16 points) Assuming that a, b and c are of type double, write a java expression that:

a) computes the volume of a box with height a, width b, and depth c.

`a*b*c`

b) computes square root of $a^2 + b^2$.

`Math.sqrt(a*a + b*b)`

c) converts the value of a to an integer by discarding any fractional part.

`(int) a`

d) is true if and only if $a < b < c$.

`a < b && b < c`

5. (16 points) The program below computes the x-intercept of a line, given the slope and y-intercept. Write the missing symbols in the spaces provided.

```
__import__ ann.easyio.*;

public class Exam1b {

    public static double xIntercept( double slope, double yIntercept )
    {
        double result;
        result = -yIntercept / slope;
        __return__ result;
    }

    public static void main(String args[])
    {
        Keyboard theKeyboard = new __Keyboard__();
        __Keyboard__ theScreen = new Screen();

        double m, b;
        double x, y;

        theScreen.println( "To compute the x-intercept of a lines" );
        theScreen.print( "Enter the slope and y-intercept:  " );

        m = theKeyboard.readDouble();
        b = theKeyboard.readDouble();

        x = __xIntercept__ ( __m__, __b__ );

        __theScreen__.println ( "The x-intercept is " + x );
    }
}
```

6. (15 points) Give an object table for a program that reads the distance to be traveled (in miles), the rate of travel (in miles per hour) and the rate of fuel consumption (in miles per gallon) and then produces the time that trip (in hours) will take and the amount of fuel consumed (in gallons).

Description	Type	Kind	Name
program	??	??	??
Screen	Screen	varying	theScreen
Keyboard	Keyboard	varying	theKeyboard
prompt for distance	String	constant	
distance to travel	double	varying	distance
prompt for rate of travel	String	constant	
rate of travel	double	varying	speed
prompt for fuel consumption	String	constant	
rate of fuel consumption	double	varying	mpg
time for trip	double	varying	time
fuel consumed	double	varying	gas

7. (20 points) Write a Java program that reads an integer value between 0 and 999 and prints the sum of the digits. The following table shows sample inputs and outputs for your program:

Input	Output
145	1 + 4 + 5 = 10
34	0 + 3 + 4 = 7

```
import ann.easyio.*;           // Keyboard, Screen, ...

class Soln7 extends Object
{
    public static void main(String [] args)
    {
        Screen theScreen = new Screen();
        Keyboard theKeyboard = new Keyboard();

        int iVal = theKeyboard.readInt();

        theScreen.println( "sum of the digits of " + iVal +
                           " is " + (iVal/100 + (iVal%100)/10 + iVal%10) );
    }
}
```

Scores

67 exams; mean 77.4

raw scores: 98(4), 96(3), 95, 94(2), 92(3), 88(3), 87(5), 86, 85, 84(3), 83(2), 82(2), 81(4), 80(2), 79, 78(3), 76, 75(3), 74, 73(4), 72, 71, 69, 68, 67, 66(3), 63, 62, 59(2), 54, 50, 45, 43, 36, 13