CS1101 Programming and Problem Solving

Dr. Gina Bai

Spring 2023

Logistics

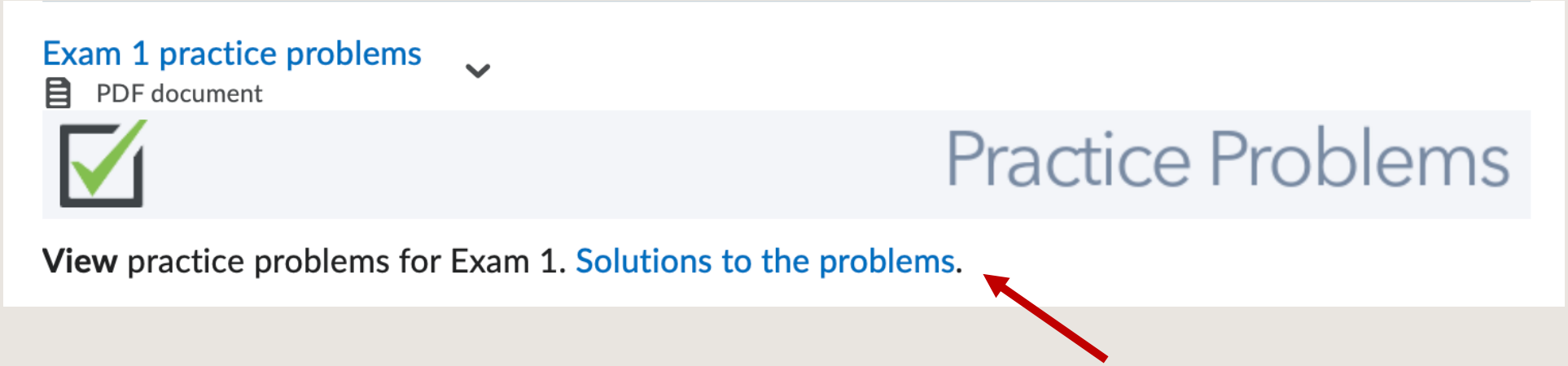
- **PA03 – W, A, B** on **zyBook > Chap 11**
  - Due: **Saturday, Feb 11**, at 11:59pm
  - Try to complete it before Exam 1

- **ZY-4A** on **zyBook > Assignments**
  - Due: Wednesday, Feb 15, at 11:59pm

Logistics

- Midterm Exam 1
  - Wednesday, Class Time

- Solutions to the practice problems are posted



The Review “Game”

- Step 1: Form a team of 2-3 (e.g., with your neighbors)
- Step 2: Get a scratch paper per team
- Step 3: Get ready! It’s closed book, closed note, and **timed**!

Q1: (60s total) True/False

a. The word Void is a valid java identifier.

b. We check if two strings are identical with the double equal signs (==).

c. In an operation with an integer and a double, java automatically promotes the integer to a double before performing the calculation.

d. && can only be used in boolean expressions

Q2: (45s total) Short Answer

a. What does the Java compiler do?

b. What does the JVM do?

c. In any given assignment statement, the expression must always appear on the _____ side

Q3: (60s total) Suppose you want to put together the words "**months of the year**" into a java identifier. According to our class style guidelines, what would the resulting identifier be for the entities below:

1. Class name _____
2. Method name _____
3. Variable name _____
4. Constant name _____

Q4: (60s total) Give the value of each of the following expressions.

a. `9 + 9 + "9 + 9" + 9 + 9`

b. `9 - 9 + "9 + 9" + 9 * 9`

c. `9 + 9 + "9 + 9" + 9 - 9`

d. `Math.min(Math.sqrt(36.0), Math.pow(2,3))`

```
int i = x % 40;
```

Q5: (60s total) If x is a positive integer, which of the following could NOT be the value of i after the statement executes?

A. 10

B. 25

C. 0

D. 1

E. 40

Q6: (60s total) What is output after the code executes?

```
int a = 10;
double b = 4.7;
int c = 5;
int x = (int) (a + b);
double y = (double) a / c;
double z = (double) (a / c);
double w = x + y + z;
System.out.println(w);
```

A. 18

B. 17

C. 17.0

D. 18.0

E. 10

Q7: (180s total) Fill out the table

```
if (a && b) {
    System.out.print("A");
}

if (b || c) {
    System.out.print("B");
}

if (a && b || c) {
    System.out.print("C");
} else {
    System.out.print("D");
}

System.out.print("E");
```

a	b	c	Output
T	T	T	
T	T	F	
T	F	T	
T	F	F	
F	T	T	
F	T	F	
F	F	T	
F	F	F	

```
int a = 10;
double b = 10.7;
int c = a + b;
```

Q8: (60s total) The last line of code will not compile. With which one of the following statements could we replace this line so that it compiles?

```
I. int c = (int) a + b;
II. int c = (int) (a + b);
III. int c = a + (int) b;
```

A. I and III
B. II and III
C. I
D. II
E. III

```
a * b - c + d % e / f
```

Q9: (60s total) Which of the expressions below is equivalent to the above?

A. `((a * b) - c) + ((d % e) / f)`

B. `((((a * b) - c) + d) % e) / f`

C. `((a * b) - c) + (d % (e / f))`

D. `((a * b) - (c + d)) % (e / f)`

E. `(a * ((b - c) + d) % e) / f`

```
int x;
x =  /* x is initialized to an integer */
if ( x % 2 == 0  &&  x / 3 == 1 ) {
    System.out.print ( "Yes" );
}
```

Q10: (60s total) For what values of x will the word "Yes" be output?

A. 4

B. Whenever x is odd and x is divisible by 3.

C. Whenever x is even and x is divisible by 3.

D. 0

E. Whenever x is even and x is not divisible by 3.

```
public static void main(String[] args){
    int y = 2;
    int a = 1, b = 0, c = 0, d = 1;
    a = p1(y);
    b = p2(c);
    d = p3(6);
}

public static int p1(int y){
    y = y + 3;
    return y;
}

public static int p2(int z){
    z = 3;
    return z;
}

public static int p3(int t){
    return t + 3;
}
```

Q11: (120s total)

1. In the method **p1()**,
   - the return type is_____.
   - the variable **y** is called a(n) _____.

2. After the above program is executed,
   - the final value for **a** in main() is _____.
   - the final value for **b** in main() is _____.
   - the final value for **c** in main() is _____.
   - the final value for **d** in main() is _____.
   - the final value for **y** in main() is _____.

Q12: (180s total) Write a method called **getStatusLightColor** that returns "red" if the fuel amount of a vehicle is less than or equal to 10% of its fuel capacity, "green" otherwise. The fuel amount and fuel capacity should be passed to the method as parameters of type double.

```
public static <____1____> <_____2_____>(<___________3___________>) {
	String result;
	if (________4___________) {
		result = "red";
	} else {
		result = "green";
	}
	return result;
}
```

Peer Grading

Q1: True/False

a. The word Void is a valid java identifier.

True

b. We check if two strings are identical with the double equal signs (==).

False

c. In an operation with an integer and a double, java automatically promotes the integer to a double before performing the calculation.

True

d. && can only be used in boolean expressions

True

Q2: Short Answer

a. What does a Java compiler do?

   Translates Java code to bytecode

b. What does a JVM do?

   Translates bytecode to binary/machine code

c. In any given assignment statement, the expression must always appear on the _____ side

   Right-hand

Q3: Suppose you want to put together the words "**months of the year**" into a java identifier. According to our class style guidelines, what would the resulting identifier be for the entities below:

1. Class name _____ **MonthsOfTheYear** ___
2. Method name ___ **monthsOfTheYear** ___
3. Variable name ___ **monthsOfTheYear** ___
4. Constant name __ **MONTHS_OF_THE_YEAR** ___

Q4: Give the value of each of the following expressions.

a. `9 + 9 + "9 + 9" + 9 + 9`

   `"189 + 999"`

b. `9 - 9 + "9 + 9" + 9 * 9`

   `"09 + 981"`

c. `9 + 9 + "9 + 9" + 9 - 9`

   `Error`

d. `Math.min(Math.sqrt(36.0), Math.pow(2,3))`

   `6.0`

```
int i = x % 40;
```

Q5: If x is a positive integer, which of the following could NOT be the value of i after the statement executes?

A. 10

B. 25

C. 0

D. 1

E. 40 ✓ x % 40 is the remainder of x / 40

Q6: What is output after the code executes?

```
int a = 10;
double b = 4.7;
int c = 5;
int x = (int) (a + b);
double y = (double) a / c;
double z = (double) (a / c);
double w = x + y + z;
System.out.println(w);
```

A. 18

B. 17

C. 17.0

D. 18.0 ✓

E. 10

Q7: Fill out the table

```
if (a && b) {
    System.out.print("A");
}

if (b || c) {
    System.out.print("B");
}

if (a && b || c) {
    System.out.print("C");
} else {
    System.out.print("D");
}

System.out.print("E");
```

a	b	c	Output
T	T	T	ABCE
T	T	F	ABCE
T	F	T	BCE
T	F	F	DE
F	T	T	BCE
F	T	F	BDE
F	F	T	BCE
F	F	F	DE

```
int a = 10;
double b = 10.7;
int c = a + b;
```

Q8: The last line of code will not compile. With which one of the following statements could we replace this line so that it compiles?

I. `int c = (int) a + b;`

II. `int c = (int) (a + b);`

III. `int c = a + (int) b;`

A. I and III

B. II and III ✓

C. I

D. II

E. III

```
a * b - c + d % e / f
```

Q9: Which of the expressions below is equivalent to the above?

A. `((a * b) - c) + ((d % e) / f)`

B. `((((a * b) - c) + d) % e) / f`

C. `((a * b) - c) + (d % (e / f))`

D. `((a * b) - (c + d)) % (e / f)`

E. `(a * ((b - c) + d) % e) / f`

```
int x;
x =  /* x is initialized to an integer */
if ( x % 2 == 0  &&  x / 3 == 1 ) {
    System.out.print ( "Yes" );
}
```

Q10: For what values of x will the word "Yes" be output?

A. 4

B. Whenever x is odd and x is divisible by 3.

C. Whenever x is even and x is divisible by 3.

D. 0

E. Whenever x is even and x is not divisible by 3.

```
public static void main(String[] args){
    int y = 2;
    int a = 1, b = 0, c = 0, d = 1;
    a = p1(y);
    b = p2(c);
    d = p3(6);
}

public static int p1(int y){
    y = y + 3;
    return y;
}

public static int p2(int z){
    z = 3;
    return z;
}

public static int p3(int t){
    return t + 3;
}
```

Q11:

1. In the method **p1()**,
   - the return type is **int**.
   - the variable **y** is called a(n) **parameter**.

2. After the above program is executed,
   - the final value for **a** in main() is **5**.
   - the final value for **b** in main() is **3**.
   - the final value for **c** in main() is **0**.
   - the final value for **d** in main() is **9**.
   - the final value for **y** in main() is **2**.

Q12: Write a method called **getStatusLightColor** that returns "red" if the fuel amount of a vehicle is less than or equal to 10% of its fuel capacity, "green" otherwise. The fuel amount and fuel capacity should be passed to the method as parameters of type double.

```
public static <____1____> <_____2_____>(<___________3___________>) {
	String result;
	if (_______4_________) {
		result = "red";
	} else {
		result = "green";
	}
	return result;
}
```

Q12: Write a method called **getStatusLightColor** that returns "red" if the fuel amount of a vehicle is less than or equal to 10% of its fuel capacity, "green" otherwise. The fuel amount and fuel capacity should be passed to the method as parameters of type double.

```
public static String <_____2_____>(<___________3___________>) {
	String result;
	if (_______4_________) {
		result = "red";
	} else {
		result = "green";
	}
	return result;
}
```

Q12: Write a method called **getStatusLightColor** that returns "red" if the fuel amount of a vehicle is less than or equal to 10% of its fuel capacity, "green" otherwise. The fuel amount and fuel capacity should be passed to the method as parameters of type double.

```
public static String getStatusLightColor(<__________3__________>) {
	String result;
	if (_______4_________) {
		result = "red";
	} else {
		result = "green";
	}
	return result;
}
```

Q12: Write a method called **getStatusLightColor** that returns "red" if the fuel amount of a vehicle is less than or equal to 10% of its fuel capacity, "green" otherwise. The fuel amount and fuel capacity should be passed to the method as parameters of type double.

```
public static String getStatusLightColor(double fuelAmount, double fuelCapacity)
{
	String result;
	if (________4__________) {
		result = "red";
	} else {
		result = "green";
	}
	return result;
}
```

Q12: Write a method called **getStatusLightColor** that returns "red" if the fuel amount of a vehicle is less than or equal to 10% of its fuel capacity, "green" otherwise. The fuel amount and fuel capacity should be passed to the method as parameters of type double.

```
public static String getStatusLightColor(double fuelAmount, double fuelCapacity)
{
	String result;
	if (fuelAmount <= 0.1 * fuelCapacity ) {
		result = "red";
	} else {
		result = "green";
	}
	return result;
}
```

Q&A