Practical sheet
Fundamental of programming
CS 102

Chapter one

An overview of computers and programming Languages

Answer the following questions:

Q1- (Area and perimeter of a circle) Write a n algorithm to find the area and perimeter of a circle that has a radius of 5.5 using the following formula:

$$\text{Perimeter} = 2 * \text{radius} * \pi$$

$$\text{Area} = \text{radius} * \text{radius} * \pi$$

Q2 (Print three sentences) write a program that print three sentences: "Welcome to Java", "Welcome to Computer Science", and "Programming is fun".

Q3-Write an algorithm to find the average of any three numbers A, B, C.

$$\text{Average} = \frac{A+B+C}{3}$$

Q4- Suppose that the cost of sending an international fax is calculated as follows: Service charges \$3.00, \$0.20 per page for the first 10 pages, and \$0.10 for each additional page. Write an algorithm that asks the user to enter the number of pages to be faxed. The algorithm then uses the number of pages to be fixed to calculate the amount due.

Sending cost = Service charges +cost *number of pages +additional cost

Chapter Two

Basic Elements of JAVA

Answer the following questions:

Q1- Write a program to read two numbers from the keyboard and display the sum of them on the screen

Q2-Which of the following are valid Java identifiers? Explain the reason

Java identifiers	T/ F	The reason
myFirstProgram		
MIX-UP		
JavaProgram2		
quiz7		
ProgrammingLecture2		
1footEquals12Inches		
Mike'sFirstAttempt		
Update Grade		
4th		
New_Student		

Q3-Which of the following is a reserved word in Java?

a. int   b. INT   c. strang   d. CHAR

Q4-Write Java statements that accomplish the following.

1. **Declare int variables x and y.**

   ……………………………………………………………………………
   ……………………………………………………………………………
   ……………………………………………………………………………

2. **Initialize an int variable x to 10 and a char variable ch to 'B'.**

   ……………………………………………………………………………
   ……………………………………………………………………………
   ……………………………………………………………………………

3. **Declare and initialize a double variable payRate to 12.50.**

   ……………………………………………………………………………
   ……………………………………………………………………………
   ……………………………………………………………………………

4-Copy the value of an int variable firstNum into an int variable tempNum.

   ……………………………………………………………………………
   ……………………………………………………………………………
   ……………………………………………………………………………

Q 5-determine data type for the following variables:

statement	Data type
1. A variable to store the first name of a student.	
2. A variable to store the discounted price of an item.	
3. A variable to store the number of juice bottles.	
4. A variable to store the number of miles traveled.	
5. A variable to store the highest test score.	

Q6- If x = 5, y = 6, z = 4, and w = 3.5, evaluate each of the following expressions, if possible. If it is not possible, state the reason.

Hint: it is available to use bluej to correct your answer

Expression	Evaluate	Reason
1. (x + z) % y		
2. (x + y) % w		
3. (y + w) % x		
4. (x + y) * w		
5. (x % y) % z		
6. (y % z) % x		
7. (x * z) % y		
8. ((x * y) * w) * z		

Q7: Given:

Which of the following assignments are valid? If an assignment is not valid, state the reason. Assume that each variable is declared as follows:
int num1, num2, newNum;
double x, y;

Assignment	T / F	Reason
num1 = 35;		
newNum = num1 – num2;		

num1 = 5;
num2 = 2 + num1;
num1 = num2 / 3;		

num1 * num2 = newNum;		
x = 12 * num1 - 15.3;		
num1 * 2 = newNum + num2;		
x / y = x * y;		
num2 = num1 % 2.0;		
x = x + y - 5;		

Q8- which of the following variable declarations are correct? If a variable declaration is not correct, provide the correct variable declaration.

Variable declarations	T/F	correct
n = 12; //Line 1		
char letter = ; //Line 2		
int one = 5, two; //Line 3		
double x, y, z; //Line 4		

Q 9- Which of the following are valid Java assignment statements? Assume that i, x, and percent are double variables.

Assignment statement	T/F
i = i + 5;	
x + 2 = x;	
x = 2.5 * x;	
percent = 10%	

Q10 - Do a walk-through to find the value assigned to e. Assume that all variables are properly declared.

 a = 3;

 b = 4;

 c = (a % b) * 6;

 d = c / b;

 e = (a + b + c + d)/ 4;

Hint: it is available to use bluej to correct your answer

Q11- Suppose x, y, z, and w are int variables. What value is assigned to each variable after the last statement executes?

x = 5;

z = 3;

y = x - z;

z = 2 * y + 3;

w = x - 2 * y + z;

z = w - x;

w++;

variable	X	Y	Z	W
Last value				

Hint: it is available to use bluej to correct your answer

Q 12: Consider the following program segment:

```
//import classes
Public class Exercise2
{
Public static void main (String[  ] args)
{
//variable declaration
//executable statements
}
    }
```
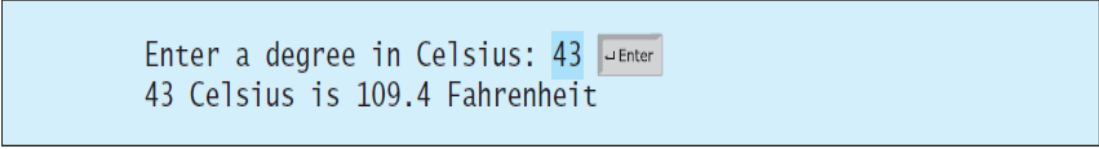
a) **Write Java statements that declare the following variables: num1, num2, and num3, and average of type int.**
b) **Write Java statements that store 125 into num1, 28 into num2, and -25 into num3.**
c) **Write a Java statement that stores the average of num1, num2, and num3 into average.**
d) **Write Java statements that output the values of num1, num2, num3, and average.**
e) **Compile and run your program**

Q13- (*Convert Celsius to Fahrenheit*) **Write a program that read a Celsius degree as a double value, then converts it to Fahrenheit and displays the result. The formula for the conversion is as follows:**

$$Fahrenheit = (9/5) * celsius + 32$$

Hint: In Java, 9 / 5 is 1, but 9.0 / 5 is 1.8.

Here is a sample run:

```
Enter a degree in Celsius: 43 ⏎Enter
43 Celsius is 109.4 Fahrenheit
```

Q14 -Consider the following program segment:

```
//import classes
Public class Exercise2
{
Public static void main (String[  ] args)
{
//variable declaration
//executable statements
}
      }
```

— **Write the java statements that declare x and y as int variables and then assign the value 25 to x and the value 35 to y.**

— **Write the following statements and what is the output of each statement?**

   a. System.out.println(x + ' ' + y);

   b. System.out.println(x + " " + y);

hint : Ascii code for space 32

Q15- Consider the following program segment:

```
//import classes
Public class Exercise2
{
Public static void main (String [  ] args)
{
//variable declaration
//executable statements
}
      }
```

Write the java statements that declare x, y, and z as int variables and x = 2, y

= 5, and z = 6. What is the output of each of the following statements?

a. System.out.println("x = " + x + ", y = " + y + ", z = " + z);

b. System.out.println("x + y = " + (x + y));

c. System.out.println("Sum of " + x + " and " + z + " is " + (x + z));

d. System.out.println("z / x = " + (z / x));

e. System.out.println(" 2 times " + x + " = " + (2 * x));

Q16: **Write Java statements that produce the following output:**

Name: //output the value of the variable name

Pay Rate: $ //output the value of the named constant RATE

Hours Worked: //output the value of the variable hoursWorked

Salary: $ //output the value of the variable wages

For example, if the value of name is "Rainbow" and hoursWorked is

45.50, then the output is:

Name: Rainbow

Pay Rate: $12.50

Hours Worked: 45.50

Salary: $568.75

Q17 - what is the output of the following program?

Program A

```
int i = 10;
int newNum = 10 * i++;

System.out.println ("i is " + i + ", newNum is " + newNum);
```

Output A

Program B

```
int i = 10;
int newNum = 10 * (++i);
System.out. println ("i is " + i + ", newNum is " + newNum);
```

Output B

Program C

```
double x = 1.0;
double y = 5.0;
double z = x- - + (++y);
```

What are the last value stored in variables x, y, z respectively?

x	Y	z

Q18-Suppose a, b, and c are int variables and a = 5 and b = 6. What value is assigned to each variable after each statement executes? If a variable is undefined at a particular statement, report UND (undefined).

1-a = (b++) + 3;

2-c = 2 * a + (++b);

3-b = 2 * (++c) - (a++);

Statement number	a	b	c
1	9	7	UND
2	9	8	26
3	10	45	27

Q19- what is the evaluation for each expression?

Expression	Evaluate to
System.out.println((int)1.7);	……………………………………
System.out.println((double)1 / 2);	……………………………………
System.out.println(1 / 2);	……………………………………
double d = 4.5; int i = (int)d;	i = ……………..
(double)(17) / 2	…………………………………
(double)(6+ 2)	…………………………………
(int)(6.8 + (double)(17) / 2)	…………………………………
(int)(6.8 + (double)(17 / 2))	…………………………………

Q20- Evaluate the following arithmetic expressions:
Hint: it is available to use bluej to correct your answer

Expression	Evaluate
1. 25 / 3	
2. 20 - 12 / 4 * 2;	
3. 32 % 7	
4. 3 - 5 % 7	
5. 18.0 / 4	
6. 28 - 5 / 2.0	
7. 17 + 5 % 2 - 3	
8. 15.0 + 3.0 * 2.0 / 5.0	