**Computer Language 2022**

**Assignment #2**

**Due: 28/Mar 23:59:59**

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**For each question, 1) write your solution codes, 2) present a screenshot of your result, and 3) describe a short explanation about your solution. Without these components, you will be given some penalties.**

**1. Convert the following if-else statement to switch-case statement.**

**public static void** main(String[] args) {  
  
 **int** i = 0;  
 **if** (i == 1)  
 System.***out***.println(**"!"**);  
 **else if** (i == 2)  
 System.***out***.println(**"@"**);  
 **else if** (i == 3)  
 System.***out***.println(**"#"**);  
 **else** System.***out***.println(**"\*"**);  
  
}

**Your code:**

public static void main(String[] args) {  
 //#1  
 int i = 0;  
  
 switch (i) {  
 case 1:  
 System.out.println("!");  
 break;  
 case 2:  
 System.out.println("@");  
 break;  
 case 3:  
 System.out.println("#");  
 break;  
 default:  
 System.out.println("\*");  
 break;  
 }

}

**Your result (screenshot):**

**텍스트이(가) 표시된 사진

자동 생성된 설명**

**Your explanation:**

**Convert else-if statements’ conditions to the case: conditions in the switch statement and add break; to each case sector.**

**2. Write a program that takes 2digit positive integer (10~99) from the user, and then checks if ten’s digit number and one’s digit number are same or not.**

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**Your code:**

public static void main(String[] args) {  
 //#2  
 System.out.print("Input 2-digit number (10-99) : ");  
 Scanner scanner = new Scanner(System.in);  
 int num = scanner.nextInt();  
 int ten = num/10;  
 int one = num-(ten\*10);  
  
 if (ten == one){  
 System.out.println("Yes! two numbers are same!");  
 }  
 else{  
 System.out.println("No! two numbers are NOT same!");  
 }

}

**Your result (screenshot)**

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**Your explanation:**

**Get input from users by using Scanner.**

**Divide the num by 10. ‘/’ only returns quotient. Then we can allocate ten’s digit to a variable ten.**

**num-(ten\*10) returns one’s digit. Then we can allocate one’s digit to a variable one.**

**Using the if statement, check variables ten and one are the same or not.**

**3. Write a simple calculator program. The available arithmetic operators are +, -, \*, and / operators. Operands and operator must be separated by whitespaces. The program must print “Cannot divide by 0” string when a user tries to “divide by 0” operation. Use a switch-case statement.**

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텍스트, 장치, 게이지이(가) 표시된 사진

자동 생성된 설명

텍스트, 장치이(가) 표시된 사진

자동 생성된 설명

**Your code:**

public static void main(String[] args) {  
 //3  
 System.out.print("Operation >>");  
 Scanner scanner = new Scanner(System.in);  
 int first = scanner.nextInt();  
 String operator = scanner.next();  
 int second = scanner.nextInt();  
 int result;  
 switch (operator){  
 case "+":  
 result = first+second;  
 System.out.print(first+operator+second+"= "+result);  
 break;  
 case "-":  
 result = first-second;  
 System.out.print(first+operator+second+"= "+result);  
 break;  
 case "\*":  
 result = first\*second;  
 System.out.print(first+operator+second+"= "+result);  
 break;  
 case "/":  
 switch (second){  
 case 0:  
 System.out.print("cannot divide by 0");  
 break;  
 default:  
 result = first/second;  
 System.out.print(first+operator+second+"= "+result);  
 break;  
 }  
 }

}

**Your result (screenshot)**

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**Your explanation:**

**Using a scanner, get some operation from the user.**

**.next(), .nextInt() are separating the string by whitespace.**

**Distinguished operator and operands are allocated variables respectively.**

**Using switch statement, divide some cases by kinds of operators, +, -, \*, and /.**

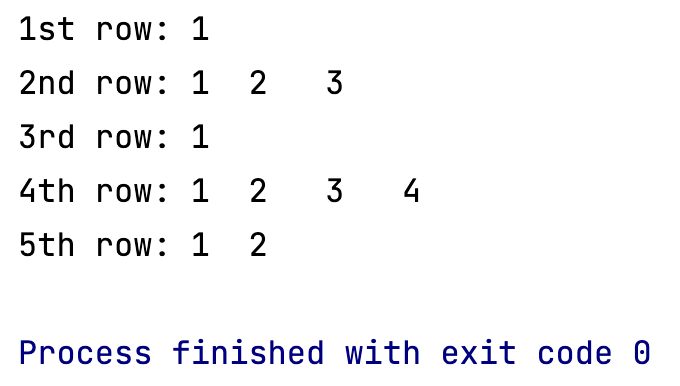
**Each case has each expression between the first and second operands with each operator.**

**Especially, in / case, second operands cannot be 0 because of a mathematical error. So using the switch statement again, distinguish the second is 0 or not.**

**4. Write a program that prints out the following 2d array:**

**int n [][] = { {1}, {1,2,3}, {1}, {1,2,3,4}, {1,2}};**

**\* use switch-case statement for printing the row number (i.e., 1st, 2nd, … 5th)!**



**Your code:**

public static void main(String[] args) {

int n[][] = {{1},{1,2,3},{1},{1,2,3,4},{1,2}};  
 int rows = n.length;  
 int columns;  
 String contents;  
 for (int i=0; i<rows; i++){  
 switch (i){  
 case 0:  
 columns = n[i].length;  
 contents = "";  
 for (int j=0; j<columns; j++){  
 contents = contents + n[i][j] + " ";  
 }  
 System.out.println("1st row : "+contents);  
 break;  
 case 1:  
 columns = n[i].length;  
 contents = "";  
 for (int j=0; j<columns; j++){  
 contents = contents + n[i][j] + " ";  
 }  
 System.out.println("2nd row : "+contents);  
 break;  
 case 2:  
 columns = n[i].length;  
 contents = "";  
 for (int j=0; j<columns; j++){  
 contents = contents + n[i][j] + " ";  
 }  
 System.out.println("3rd row : "+contents);  
 break;  
 case 3:  
 columns = n[i].length;  
 contents = "";  
 for (int j=0; j<columns; j++){  
 contents = contents + n[i][j] + " ";  
 }  
 System.out.println("4th row : "+contents);  
 break;  
 case 4:  
 columns = n[i].length;  
 contents = "";  
 for (int j=0; j<columns; j++){  
 contents = contents + n[i][j] + " ";  
 }  
 System.out.println("5th row : "+contents);  
 break;  
 }  
 }  
  
  
}

**Your result (screenshot)**

**텍스트이(가) 표시된 사진

자동 생성된 설명**

**Your explanation:**

**n.length is 5**

**using for statement with nested switch statement make some conditions and orders for each array’s row.**

**Each row has a different number of columns. So, each case initializes variable columns and uses nested for the statement in the switch statement. The nested for statement allocate each elements of the row in variable columns.**

**5. Write a simple program that takes a decimal system number and print the octal system number. Assume that a user will type 0~1000 as input number. You cannot use Integer class’s method to solve this question.**

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**Your code:**

public static void main(String[] args) {  
 //#5  
 Scanner scanner = new Scanner(System.in);  
 System.out.print("Input your number (decimal): ");  
 int input = scanner.nextInt();  
 int octal[] = new int[4];  
  
 for (int i=0; i<=3; i++){  
 octal[i] = input%8;  
 input = input/8;  
 }  
 System.out.print("Your number in Octal system: ");  
 System.out.println(octal[3]\*1000+octal[2]\*100+octal[1]\*10+octal[0]);

}

**Your result (screenshot)**

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**Your explanation:**

**Maximal decimal number is 1000, and 1000 in octal system is 1750. So, we need 4 digits in array.**

**Using ‘%8’ and then ‘/8’ can show what number is required in each octal slot at given decimal numbers.**

**Digit for 1 is allocated index 0, digit for 8 is allocated index 1, digit for 64 is allocated index 2, digit for 512 is allocated index 3.**

**Index3 \*1000 + index2\*100 + index1\*10 + index0 is represented octal system number.**

**6. Write a program to print out the following triangle pattern. The program should take the height of a triangle from the user (user’s input will be 3~10). Hardcoded program is not accepted.**

**텍스트이(가) 표시된 사진

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**텍스트이(가) 표시된 사진

자동 생성된 설명**

**테이블이(가) 표시된 사진

자동 생성된 설명**

**Your code:**

public static void main(String[] args) {  
 //#6  
 Scanner scanner = new Scanner(System.in);  
 System.out.print("Enter the number of rows: ");  
 int height = scanner.nextInt();  
  
 for (int i=height; i>=1; i--){  
 System.out.println("\*".repeat(i));  
 }

}

**Your result (screenshot)**

**텍스트이(가) 표시된 사진

자동 생성된 설명**

**텍스트이(가) 표시된 사진

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**Your explanation:**

**Scanner get input about height from users.**

**Use for statement to print “\*” from height to 1 with i decrement by 1.**

**7. Write a program to print out the following triangle pattern. The program should take the height of a triangle from the user (user’s input will be 3~10). Hardcoded program is not accepted.**

**텍스트이(가) 표시된 사진

자동 생성된 설명**

**텍스트이(가) 표시된 사진

자동 생성된 설명**

**테이블이(가) 표시된 사진

자동 생성된 설명**

**Your code:**

public static void main(String[] args) {  
 //#7  
 Scanner scanner = new Scanner(System.in);  
 System.out.print("Enter the number of rows: ");  
 int height = scanner.nextInt();  
  
 for (int i=height; i>=1; i--){  
 if (i==height){  
 System.out.println("\*".repeat(i));  
 }  
 else if (i!=1){  
 System.out.println("\*"+" ".repeat(i-2)+"\*");  
 }  
 else {  
 System.out.println("\*".repeat(i));  
 }  
 }

}

**Your result (screenshot)**

**텍스트이(가) 표시된 사진

자동 생성된 설명**

**텍스트이(가) 표시된 사진

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**Your explanation:**

**The first line should be filled fully with “\*”.**

**The end line should be one “\*”**

**The rest line should be empty except the first “\*” and the end “\*”.**

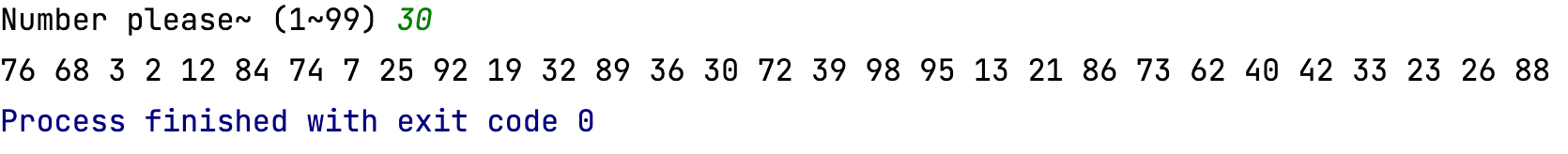
**Use the ‘.repeat()’ method for repeating string.**

**8. Write a program that 1) takes a positive integer number *N* (less than 100) from the user, 2) creates an integer array with the size of *N,* 3) fills in this array using a set of random numbers ranging from 1~100, 4) prints out the numbers in this array. However, this array CANNOT have the duplicated numbers.**

**\* Hint: find the usage of Math.random() method**

**텍스트이(가) 표시된 사진

자동 생성된 설명**

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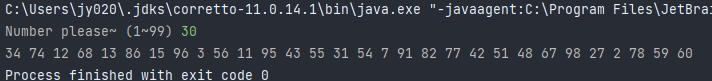
**Your code:**

//#8  
Scanner scanner = new Scanner(System.in);  
System.out.print("Number please~ (1~99) ");  
int n = scanner.nextInt();  
int array[] = new int[n];  
  
for (int i=0; i<n; i++){  
 array[i] = (int)(Math.random()\*100)+1;  
  
 for (int j=0; j<i; j++){  
 if (array[i] == array[j]){  
 i--;  
 break;  
 }  
 }  
}  
  
for (int i=0; i<n; i++){  
 System.out.print(array[i]+" ");  
}

**Your result (screenshot)**

**텍스트이(가) 표시된 사진

자동 생성된 설명**

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**Your explanation:**

**Use the scanner to get the size of the array from users.**

**Use Math.random() method to get random numbers between 1 to 100 and use for the statement to allocate each array element.**

**Use nested for the statement to remove the duplicated numbers. Check new assigned element is the same as the existing element and if the statement finds the case, then back to the previous step by ‘i--’ and ‘break’ and allocate again. Repeat this procedure until all elements are different.**

**9. Write a program that takes a single string from the user. Then, your program needs to convert uppercase letters included in that string into lowercase letters and vice versa. The result should be identical to the following examples. However, you cannot use String/Character class’s toupper()/tolower()-related methods.**

**\*Hint: Find the usage of String’s charAt() method to take the n-th character of the string  
\*Hint: what is the Unicode number of ‘A’ and ‘a’?**

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**텍스트이(가) 표시된 사진

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**Your code:**

public static void main(String[] args) {  
 //#9  
 Scanner scanner = new Scanner(System.in);  
 System.out.println("Input your string:");  
 String str = scanner.next();  
  
 for (int i=0; i<str.length(); i++){  
 char c = str.charAt(i);  
 int uni;  
 if ((int)c>=97){  
 uni = (int)c-32;  
 }  
 else {  
 uni = (int)c+32;  
 }  
 System.out.print((char)uni);  
 }  
}

**Your result (screenshot)**

**텍스트이(가) 표시된 사진

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**텍스트이(가) 표시된 사진

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**Your explanation:**

**Unicode has converted the hexanal system to the decimal system.**

**A -> \u0041 -> 65**

**A -> \u0061 -> 97**

**The capital letter and the lower letter has 32 differences in the Unicode decimal system.**

**The capital letter converts Unicode by casting and the lower letter converts Unicode by casting and then, minus or plus 32 to change capital to lower, lower to capital.**

**Use the scanner to get input from users.**

**Use for loop and casting to covert each character to number.**