



**Exercise 1**

(5 Marks)

Mark the correct answer in the following (**only one choice**):

- 1) What value is placed in
- `choice`
- ?

```
int a=5, b=10, c=15 ;
```

```
choice = a>b && a>c ? a : (b > c ? b : c) ;
```

- 5  
 10  
 15  
 0

- 2) What is wrong with the following statement?

```
if (a<6) {} else a = 6;
```

- The else should be written on a separate line.  
 There has to be something inside the curly brackets.  
 There have to be curly brackets around the `a=6`.  
 Nothing. It is ugly, but it is legal.

- 3) What is the value of the following expression?

```
Integer.parseInt("56");
```

- 56  
 "56"  
 It is not legal in Java

- 4) A
- `swap`
- method for integers is defined as follows:

```
public void swap(int x, int y){
    int temp = x;
    x = y;
    y = temp;
}
```

Assume `int a = 10; int b =20;` What is the result of `a` and `b` after `swap(a,b)` is called?

- `a = 20, b =10`  
 `a = 10, b = 20`  
 `a = 10, b = 10`  
 `a = 20, b = 20`

- 5) What is the return value for
- `xMethod(4)`
- after calling the following method?

```
static int xMethod(int n) {
    if (n == 1)
        return 1;
    else
        return n + xMethod(n - 1);
}
```

- 12  
 11  
 10  
 9  
 None of the above

**Exercise 2**

(5 Marks)

Write a Java program using a **switch statement** that asks the user for a grade and displays the following message depending on the entered grade. Please note that the user can enter grades either in upper case or in lower case.

- if the grade variable has the value of A, the program should display

You got an A. Great job!

- if the grade variable has the value of B, the program should display

You got a B. Good work!

- if the grade variable has the value of C, the program should display

You got a C. You'll never get into a good college!

- Otherwise the program should display

You got an F. You'll do well in Congress!

**USE A SWITCH STATEMENT**

Complete the following program:

```
import java.io.*;
public class Grade {

public static void main(String args[]) throws IOException
{
BufferedReader stdin = new BufferedReader(new InputStreamReader( System.in) );
    System.out.println("Enter the grade" );

    String inData;
    inData = stdin.readLine();
```

**Solution:**

```
import java.io.*;
public class Grade {

public static void main(String args[]) throws IOException
{
BufferedReader stdin = new BufferedReader(new InputStreamReader( System.in) );
    System.out.println("Enter the grade" );

    String inData;

    char grade;
    inData = stdin.readLine();
    grade = inData.charAt(0);

    switch(grade){
    case 'A':
    case 'a':
        System.out.println(" You got an A. Great job!");
        break;
    case 'B':
```

```
        case 'b':
            System.out.println("You got a B.Good Work!");
            break;
        case 'C':
        case 'c':
            System.out.println("You got a C.You'll never get into a good college!");
            break;
        default: System.out.println("You got an F. You'll do well in Congress!");
    }
}
}
```

**Exercise 3**

(8 Marks)

Write a Java method `sumOfDigits` that takes a string consisting of text and nonnegative numbers as input and returns the sum of the digits of all the numbers in the string. For example for the string:

"The year has 12 months, each month has 4 weeks and the week has 7 days"

your program should return 14, i.e. the result of  $1+2+4+7$ .

Do not write a `main` method.

**Solution:**

```
public static int sumOfDigits(String s)
{
    int sum = 0;
    for(int i = 0; i<s.length(); i++)
    {
        switch(s.charAt(i))
        {
            case '1' : sum+=1; break;
            case '2' : sum+=2; break;
            case '3' : sum+=3; break;
            case '4' : sum+=4; break;
            case '5' : sum+=5; break;
            case '6' : sum+=6; break;
            case '7' : sum+=7; break;
            case '8' : sum+=8; break;
            case '9' : sum+=9; break;
        }
    }
    return sum;
}
```

**Exercise 4**

(6 Marks)

Given the following program

```
public static String findOut(String s)
{
    int i = s.length();
    int l = s.length();
    String r = "";

    while(i>0)
    {
        do
        {
            l--;
        }while(l>=0 && s.charAt(l)!='.');

        r+=s.substring(l+1,i);
        if(l>0)
            r+='.';
        i = l;
    }
    return r;
}
```

What is the return value of the method `findOut("cs.guc.edu")`? Justify your answer.

The method `substring(int start, int end)` returns a new string that is a substring of this string. The first integer argument `start` specifies the index of the first character. The second integer argument `end` is the index of the last character - 1. For example

```
"hello".substring( 1 ,3 ) == "el";
```

**Solution:**

The program will output the domain in reverse:

```
edu.guc.cs
```

**Exercise 5**

(10 Marks)

Write a Java program that reads a number  $n$  and prints the following shape. For example if  $n = 5$  it will print:

```
+
12
+++
1234
+++++
```

Complete the following program:

```
import java.io.*;
public class Triangle
{
    public static void main(String[] args) throws IOException
    {
        InputStreamReader instream= new InputStreamReader(System.in);
        BufferedReader stdin= new BufferedReader(instream);
        String sNumber;
        System.out.println("Please enter the number");
        sNumber= stdin.readLine();
    }
}
```

**Solution:**

```
import java.io.*;
public class Pyramid_num1
{
    public static void main(String[] args) throws IOException
    {
        InputStreamReader instream= new InputStreamReader(System.in);
        BufferedReader stdin= new BufferedReader(instream);
        String sNumber;
        System.out.println("Please enter the number");
        sNumber= stdin.readLine();
        int n = Integer.parseInt(sNumber);
        int i,j,k;
        for(i=1;i<=n;i++)
        {
            if (i%2==1)
                for(j=1;j<=i;j++)
                    System.out.print("*");
            else
                for(k=1;k<=i;k++)
                    System.out.print(k);

            System.out.print("\n");
        }
    }
}
```

**Exercise 6**

(10 Marks)

Write a Java program that takes a string containing text and nonnegative numbers from the user and prints out the numbers contained in the string in separate lines.

**Hint:** Please note that characters can be compared in different ways. One way is to use the unicode values of the characters, '0', 1, ..., 9. Unicode of '0' is 48, ..., Unicode of '9' is 57.

Running example

```
Please enter your string
The year has 365 days and the day has 12 hours
Output
The numbers contained in your string are
365
12
```

Complete the following program:

```
import java.io.*;
public class ExtractNumbers
{
    public static void main(String[] args) throws IOException
    {
        InputStreamReader instream= new InputStreamReader(System.in);
        BufferedReader stdin= new BufferedReader(instream);
        String s;
        System.out.println("Please enter your string");
        s = stdin.readLine();
    }
}
```

**Solution:**

- A solution with a simple loop

```
import java.io.*;
public class ExtractNumbers throws IOException
{
    public static void main(String[] args)
    {
        InputStreamReader instream= new InputStreamReader(System.in);
        BufferedReader stdin= new BufferedReader(instream);
        String s;
        System.out.println("Please enter your string");
        s = stdin.readLine();

        for(int i = 0; i<s.length(); i++)
        {
            if(s.charAt(i)<='9' && s.charAt(i)>='0')
            if(i==s.length()-1 || s.charAt(i+1)>='9' || s.charAt(i+1)<='0')
            //println only if the next character is not a digit
                System.out.println(s.charAt(i));
            else
                System.out.print(s.charAt(i));
        }
    }
}
```

- A solution with nested loops:

```
import java.io.*;
```



```
public class ExtractNumbers throws IOException
{
    public static void main(String[] args)
    {
        InputStreamReader instream= new InputStreamReader(System.in);
        BufferedReader stdin= new BufferedReader(instream);
        String s;
        System.out.println("Please enter your string");
        s = stdin.readLine();

        int i = 0;
        int flag = 0;

        while(i<s.length())
        {
            while(i<s.length() && s.charAt(i)<=57 && s.charAt(i)>=48)
            //the end of the string is not reached and there is a number between 0 and 9
            {
                System.out.print(s.charAt(i));
                i++;
                flag++;
            }

            if(flag > 0)
            {
                flag = 0;
                System.out.println();
            }

            i++;
        }
    }
}
```

**Exercise 7**

(6 Marks)

What is the output of the following program? Justify your answer.

```
public class Parm {
    public static void main(String argv[]){
        amethod();
    }

    public static void amethod(){
        int i=10;
        System.out.println("Before another i= " +i);
        another(i);
        System.out.println("After another i= " + i);
    }

    public static void another(int i){
        i+=10;
        System.out.println("In another i= " + i);
    }
}
```

**Solution:**

```
Before another i= 10
In another i= 20
After another i= 10
```

**Exercise 8**

(10 Marks)

Write a recursive method called `base5` that takes a nonnegative integer as parameter and displays its corresponding value in base five. For example:

- `base5(3)` displays 3.
- `base5(5)` displays 10.
- `base5(136)` displays 1021

Write a main method to test your method.

**Solution:**

```
public static void base5(int n)
{
    if (n < 5)
        System.out.print(n);
    else
    {
        base5(n/5);
        System.out.print(n%5);
    }
}

public static void main(String argv[])
{
    int n = 136;
    base5(n);
}
```