PROGRAMMING FUNDAMENTALS

Fall XXXX

First DEMO exam. Part A

Duration: 30 minutes approx. Write your answers in the boxes. Use black or blue pen. Do not remove staple.

Surname(s), name: **SOLUTION**

EXERCISE 1 [1.5 points] Variables named `dogs`, `cats` and `rats` have been declared integer (int). Variable `answer` has been declared character (char). When the value of `answer` is the character ***a*** or the character ***A*** it means that the user is an animalist; any other character means that he/she is not an animalist. Write the conditions (boolean expressions) for …

a) Dogs is not in [14, 20) but rats is multiple of 10

```
!(dogs>=14 && dogs<20) && rats%10==0

also

(dogs<14 || dogs>=20) && rats%10==0   (Remember De Morgan…)
```

b) Dogs plus rats is odd and the digits of the tens of cats is 3

```
(dogs + rats)%2==1 && cats/10%10==3

also

(dogs + rats)%2!=0 && cats/10%10==3
```

a) User is not an animalist or not all numbers are lower than 6

```
!(answer=='a' || answer='A') || !(dogs<6 && cats<6 && rats<6)

also

(answer!='a' && answer != 'A') || (dogs>=6 || cats>=6 || rats>=6)
```

EXERCISE 2 [1 point. All or nothing] Consider the following fragment of code.

```
int a, b, c;
bool decision;

a = Convert.ToInt32(Console.ReadLine());

a = a + 15 / 8 - 1;
decision = !true || a > 3;
c = 0;

if (decision){ b = 2 * a; }
else { b = -a; }

if (decision != true)
{
    if (a%2==1) { c++; }

    if (b<1) { c++; }

}
else if (a == -b) { c--; }
else
{

    if (a>=2) { c = c + 4;}

    else { c = c + 3; }

    if (decision || false && !decision) { c++; }
}
```

If the value given to **a is 3**, the final value of c will be: 2

If the value given to **a is 4**, the final value of c will be: 5

EXERCISE 3 [1 point. Almost all or nothing] Consider the following fragment of code.

```
int a, b;
double d, e;

a = 9 - 5 / 2 + 8 % 9 + 1 / 2;
b = a / 2 * 1 % 5;

d = 9 / 2.0 + 1 / 2 + b / 2;
e = (a / b) * b + 1.5;
```

The value of **a** will be: 15

The value of **b** will be: 2

The value of **d** will be: 5.5

The value of **e** will be: 15.5

EXERCISE 4 [1 point. All or nothing] When the following code is executed, what will the final values of totalOne and totalTwo be?

```
int totalOne, totalTwo;

totalOne = 0;
totalTwo = 0;

for (int outer=4; outer<=8; outer++)
{
    totalOne = totalOne + outer;

    totalTwo = 0;
    for (int inner=1; inner<outer; inner++)
    {
        totalTwo = totalTwo + inner;
    }

    totalOne = totalTwo + totalOne;
}
```

The final value of **totalOne** will be: 110

The final value of **totalTwo** will be: 28