CONTROL EXAM (Duration 1h10)

Mobile phones are not allowed at all during the exam!!!

Exercise 1 (5 pts):

After finishing their exams, **three** friends want to decide if to go on a trip. The final decision to go or not is based on their yes-no voting. This means that if the majority (at least two of them) votes for "yes", the trip will be held. The trip will be cancelled otherwise.

Create an algorithm and flowchart that reads the decision of each friend ("yes" or "no") and then prints *"Trip OK"* if at least two friends vote for "yes". The algorithm prints *"Trip Not OK"* otherwise (if at least two friends vote for "no").

Remarks:

- Assume that the input provided by each friend is either "yes" or "no", and not other thing.
- **Do not use** the logical operators (AND and OR) in all your decisions.

Exercise 2 (5 pts):

Create an algorithm and flowchart that prints the sum of the series

$$1+\frac{1!}{(x-1)}+\frac{2!}{(x-1)^2}+\frac{3!}{(x-1)^3}+\frac{4!}{(x-1)^4}+\cdots+\frac{n!}{(x-1)^n}$$

Remarks:

- Before calculating the sum, make sure that x given by the user is not equal to 1. Therefore, the user is repeatedly asked to enter x until it becomes different from 1.
- **Do not use** the power operator (^).

FINAL EXAM (duration 1h30)

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Exercise 1: (6 pts)

1. Without explanation, correct the following statements written in C: (statements are independent)

```
a) int number#1,  3_value;
b) printf( "The sum of %d and %d is %d" , sum );
c) scanf( "%d", age );
d) if ( x = y )
        printf("the two numbers are equal"\n);
e) if ( z > 10 )
     x + y = z;
   else;
     z++;
f) max=(x>y and x!=0)? x:y;
```

2. Indicate the result of each of the following C statements where x is an integer.

```
a) x = 7 + 3 * 6 / 2 - 1;
b) x = 2 % 2 + 2 * 2 - 2 / 2;
c) x = 3 * 9 * (3 + (9 * 3 / 3));
```

3. Give the output of the following three C programs.

Program1	Program2	Program3

`#include <stdio.h>`
`int main()`
`{`
`int a=4,b=9;`
`b/=a;`
`printf("%d",b);`
`}`
	`#include <stdio.h>`
	`int main()`
	`{`
	`int a, x=2;`
	`float z, y=7.0;`
	`a = y / x;`
	`printf("%d",a) ;`
	`return 0 ;`
	`}`
		`#include <stdio.h>`
		`int main()`
		`{`
		`int x=5, y;`
		`y = x++;`
		`printf("%d %d", x, y);`
		`return 0 ;`
		`}`

Exercise 2: (5 pts)

Create **an algorithm** for the following problem:

The user is asked to enter two times of the same day (time1 and time2) and, the algorithm then indicates which time comes earlier in that day (which one comes first). The algorithm should also indicate if they are the same. Notice that every time should be read as two variables for the hours, and the minutes. For example time1is represented by (h1, m1) and time2 by (h2, m2). The number of seconds is not considered.

It is not necessary to do error checking - you may assume that the user will correctly enter the number of hours between 0 and 23 and the number of minutes between 0 and 59.

Possible outputs of the algorithm are: "time1 first", "time2 first", or "time1 equals time2".

Exercise 3: (5pts)

Create an **algorithm** and **flowchart** that prints the sum of the series:

$$1+\frac{1}{1+x}+\frac{1+2}{1+x+x^2}+\frac{1+2+3}{1+x+x^2+x^3}+\cdots+\frac{1+2+3+\cdots+n}{1+x+x^2+x^3+\cdots+x^n}$$

In your solution :

- Use **while** loop.
- **Do not use** the power operator (^).

Exercise 4: (4pts)

A parking garage charges a **50 dinars** minimum fee to park for up to **three hours** and an additional **20 dinars** for each extra hour. Write a **C program** that reads the number of parked hours for a given customer who parked his car in the garage, and then calculates and prints the amount of his parking fees.