C Programming

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TP 01

Exercice 1: (Quick Recap)

1. In how many bits an integer is stored?
2. In how many bytes an integer is stored?
3. What would be printed if you run the following program:

```c
#include <stdio.h>
int main()
{
    printf("%d\n", 1 >> 1);
    printf("%d\n", 1 << 1);
    printf("%d\n", 1 << 2);
    return (0);
}
```

   - Explain the behavior.
   - Explain why shifting an integer by 1, is equivalent to multiplying it by 2.

4. What is the range of values, that could be stored in an unsigned char.
5. what is the range of values, that could be stored in a char.
6. which bit is reserved to represent the sign, in the case of an integers.

Exercice 2:

Consider the following program:

```c
#include <stdlib.h>
#include <stdio.h>


int **dummy(int **x, int n)
{
        int **y;
```

```
        int i;
        int j;

        i = 0;
        y = (int**)malloc(sizeof(int*) * (n + 1));
        while (i < n)
        {
                y[i] = (int*)malloc(sizeof(int) * n);
                j = 0;
                while(j < n)
                {
                        y[i][j] = j;
                        j++;
                }
                i++;
        }
        y[n] = x[0];
        return(y);
}

int main()
{
        int n;
        int **x;
        int i;
        int j;

        n = 10;
        i = 0;
        x = (int**)malloc(sizeof(int*) * n);
        while (i < n)
        {
                x[i] = (int*)malloc(sizeof(int) * n);
                j = 0;
                while(j < n)
                {
                        x[i][j] = j;
                        j++;
                }
                i++;
        }
        x = dummy(x, n);
        i = 0;
        while (i < n + 1)
        {
                j = 0;
                while (j < n)
                {
                        printf("%d ", x[i][j]);
                        j++;
                }
                printf("\n");
                i++;
        }
}
```

Using valgrind, hunt down every memory leak and eliminate it.

Exercice 3:

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Exercice 4: (Bonus)

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Exercice 5: (Bonus)

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