

# Computer Science 1MC3

## Lab 11 – Exam Prep

---

For every question test your function from a main program.

---

### Question 1

The standard c libraries do not have the functions `factorial` or `exponentiation` defined. Create these functions.

Recall:

$$6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$$

and

$$6^4 = 6 \cdot 6 \cdot 6 \cdot 6$$

Use these headers:

```
fact(int n);  
exp(int x, int n);
```

---

### Question 2

`cos(x)` can be approximated by the following series:

$$\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$$

or more generally:

$$\sum_{i=0}^n (-1)^i \cdot \frac{x^{2i}}{(2i)!}$$

Write the procedure:

```
float cos(float theta, int n);
```

to approximate `cos` to any accuracy (n terms).

\*note\* It will be necessary to use the functions you defined in Question 1.

---

### Question 3

Design a function to take a character array and push every letter by a degree n.

For example, the character array "Hello world" pushed by a degree of 4 would be "rldHello Wo".

Remember to import `<string.h>` so you can use `strlen()` ; .

Use the following program header:

```
char* cycle(char *a, int n);
```

---

### Question 4

Create a function to print out a character array in the following fashion:

Given

"Hello World"

Output

```
H
 e
  l
   l
    o

W
 o
  r
   l
    d
```

---