Exercise 1: Simple Programs

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1 February 2018

1 Hello, World!

Problem description: Write a program to print `Hello, World!` on the screen.

Specification: The program prints the string on `stdout`.

Program design: the function `main()` calls `printf()` to print the string on `stdout`.

Program:

```
#include<stdio.h>
int main()
{
  printf("Hello, World!");
  return 0;
}
```

Output:

```
Hello World!
```

2 Power

Problem description: Write a program to calculate `a^n`.

Specification: The function `power()` takes base `a` and power `n` (+ve or -ve) as inputs and returns output `a^n`, using `powp()` which takes `a` and `n` where `n` is positive.

Prototype:

```
int powp(int a, int n)
float power(int a, int n)
```

Program design: The function `powp(a, n)` calculates `a^n` for +ve `n` and `power(a, n)` uses it to calculate `a^n` for +ve and -ve `n`. The `main()` function is used for testing.

Program:

```
#include<stdio.h>
int powp(int x, int n) // +ve n
{
  int p = 1, i = 1;
  while(i++ <= n) p *= x;
  return p;
}
float power(int x, int n) // +ve and -ve n
{
  if(n < 0)
    return 1.0/powp(x,-n);
  else
    return powp(x,n);
}
int main()
{
  int a, m;
  scanf("%d", &a);
  scanf("%d", &m);
  printf("%f", power(a,m));
  return 0;
}
```

Test Input:

```
2 -1
```

Output:

```
0.5
```