

COMP500 / ENSE501: Week 7 – Exercise:

EXERCISE NAME: *The Tree*

Create a program that outputs an ASCII art tree based upon the user's desired height.

The program must start by querying the user for a tree height. It must then output the corresponding tree. The leaves of the tree must alternate between '*' and '+' symbols. Ensure the base of the tree is printed centred with the bottom row of the tree.

After printing the tree, print eight random presents. Randomly pick a symbol for each of the eight presents. Choose from these ten possible symbols: '!', '@', '#', '\$', '%', '^', '&', '*', '-', and '='.

Finally, the program must print a happy mid-semester class break message as shown below.

For example, when the user selects a tree height of 7, the following occurs:

```
How tall? 7

  *
 + *
+ * +
* + * +
* + * + *
+ * + * + *
+ * + * + * +
  | |
  \ /
 \ / \ / \ / \ / \ / \ / \ /
[!] [$] [&] [$] [!] [$] [@] [*]

Happy mid-semester class break!
```

Tree heights of 3 and greater are acceptable. The program must validate the user's input. For example:

```
How tall? 3

Invalid! Must be greater than two!
```

For example, when the user selects a tree height of 8, the following occurs:

```
How tall? 8

      *
    + *
  + * +
 * + * +
* + * + *
+ * + * + *
+ * + * + * +
* + * + * + * +
  _|_|_
  \___/

\\ / \\ / \\ / \\ / \\ / \\ / \\ / \\ /
[@] [*] [$] [!] [$] [&] [$] [!]

Happy mid-semester class break!
```

For example, when the user selects a tree height of 3, the following occurs:

```
How tall? 3

  *
+ *
+ * +
_|_|_
\___/

\\ / \\ / \\ / \\ / \\ / \\ / \\ / \\ /
[*] [!] [@] [!] [$] [$] [&] [$]

Happy mid-semester class break!
```

Declare and define at least **five** useful functions in addition to the **main** function.

Do not use global variables or **goto**! Follow good programming standards for code layout whitespace, naming and commenting. Ensure your C source code can successfully compile. Test your program with a variety of inputs and ensure the resulting program output is exactly as described above.