1. Introduction.

This program attempts to control a conveyor carrying a wool bale by appropriate variations of a an power output value given an input reading of a position encoder. There are several practical considerations such as the fact that:

- the conveyor control hardware has a certain delay before control instructions have an effect at the output
- the control change itself takes time to move from one setting to another, this time may be insignificant

The program attempts to determine an approximate power setting to achieve a certain speed and makes small adjustments to that level to control the speed.

The program outline is constructed as follows.

```
⟨ Include necessary header files 3 ⟩
⟨ Preprocessor definitions ⟩
⟨ Define fundamental types and declarations needed by other declarations 2 ⟩
⟨ Declare types, functions and shared variables 4 ⟩
⟨ Implement functions 5 ⟩
int main(int argc, char *argv[])
{
  ⟨ Declare main function variables 6 ⟩
  ⟨ Initialise the application structures 7 ⟩
  ⟨ Perform the application task 8 ⟩
  return 0;
}
```

2. The C language does not have a boolean type so we define one for use throughout our program. *double*

```
#define FALSE 0
#define TRUE 1
⟨ Define fundamental types and declarations needed by other declarations 2 ⟩ ≡
  typedef int BOOL;
```

This code is used in section 1.

3. The program needs some standard libraries for access to input and output on standard io streams and for access to functions such as `exit()`.

```
⟨ Include necessary header files 3 ⟩ ≡
#include <stdio.h>
#include <stdlib.h>
```

This code is used in section 1.

4. In this template there are no functions or shared variables.

⟨ Declare types, functions and shared variables 4 ⟩ ≡

This code is used in section 1.

5. There are no functions to implement.

⟨ Implement functions 5 ⟩ ≡

This code is used in section 1.

6. There are no variables.

⟨ Declare main function variables 6 ⟩ ≡

This code is used in section 1.

7. No initialisation is required.

⟨ Initialise the application structures 7 ⟩ ≡

This code is used in section 1.

8. This is a hello world application so we simply say hello.

⟨ Perform the application task 8 ⟩ ≡

```
printf("Hello␣World\n");
```

This code is used in section 1.

9. Programmers notes. Under Mac OS X or Linux, the program can be compiled and linked using:

```
ctangle controller.w
cc -o controller controller.c
```

10. Index.