COMPUTER SCIENCE TRIPOS Part Ib – 2017 – Paper 3

1 Programming in C and C++ (NK)

(a) Consider the following program, written to test whether the representation of
int on a particular architecture uses two's complement or not.

```
#include <limits.h>
#include <stdio.h>

int main(void) {
  printf("%d\n", (INT_MAX + 1) < 0);
  return 0;
}
```

Explain what this program is permitted to output, and why.   [5 marks]

(b) Consider the following C function, intended to receive a string as an argument
and return a reversed string as a result. (The strlen function returns the
number of characters in the string.)

```
#include <string.h>
#include <stdlib.h>

char *reverse(char *input) {
  int len = strlen(input);
  char output[len];
  for (int i = 0; i < len; i++) {
      output[len - i - 1] = input[i];
  }
  return output;
}
```

(i) Identify three bugs in this function.   [6 marks]

(ii) Write a correct version of this function.   [9 marks]