CSP 740 : Software Engineering, IIT Jammu

Lab Assignment No 1: Splint Exercises

SPRING Semester 2018-19

Instructions:

1. *The date of submission: 9th February 2019. For every 24 hours of delayed submission after the deadline, 10 marks will be deducted from the maximum marks of the assignment, without any exception, whatsoever may be the scapegoat.*

2. ***Maximum Points 50. The maximum points carried by questions are as follows: Q1: 1 mark, Q2 to Q8: 6 marks each.***

1. Analyze and briefly discuss how Rice$'s$ theorem applies to Static Analysis.

2. Run the following code with splint and identify the error. Modify the code to correct it.

Listing 1: Problem 2

```c
int main() {
        int \*p = NULL; // line number 2
        int test;
        (void) scanf("%d", &test);
        if(test > 0)
                p = \&test;
        else
                \*p = 123;        // line number 8
        return 1;
}
```

3. Run the following code with splint and identify the error. Modify the code to correct it.

Listing 2: Problem 3

```c
#include <stdlib.h>
struct check {
        char *sname;
        size_t ncount;
};

static int f1(struct check *testc) {
        char \*b = (char \*)malloc(sizeof(char));
        if(b == NULL)    return 0;
        printf("Input String: ");
        (void) scanf("%s", b);
        testc->sname = b;
        testc->ncount = strlen(b);
        return 1;
}

static char* f2(){
        char *str =
        (char*) malloc(sizeof(char));
        if(str != NULL)
                strcpy(str, "TESTING");
        return str;
}
int main(){
        struct check *c =
```

```c
                    (struct check*)malloc(sizeof(struct check));
        if(c==NULL)
                        exit(0);
        if(f1(c) == 0) {
                if(c->sname != NULL)
                        free(c->sname);
        c->sname = f2();
        if(c->sname != NULL)
                c->ncount = strlen(c->sname);
        }
        if(c != NULL)
                free(c);
        return(1);
}
```

4. Using the /@null@/ and the /@in@/, /@out@/ annotations correct the program in Problem #3 above.

5. Run splint on the code shown below and explain the errors:.

Listing 3: Problem 5

```c
#include <stdlib.h>
static int* f1() {
        int value;
        printf("Input Number: ");
        (void) scanf("%d", &value);
        return \&value;
}
static char* f2() {
        return "TESTING";
}

int main() {
        int *retvalue;
        char *str = (char *)malloc(sizeof(char));
        retvalue = f1();
        if(*retvalue > 0 && str != NULL)  {
                strcpy(str, f2());
                printf("String: %s \n", str);
        }

        if(str != NULL)
                free(str);
        if(retvalue != NULL)
                free(retvalue);
        return(1);
}
```

6. Using the /@null@/, the /@observer@/, /@only@/ annotations correct the program in Homework Assignment #5, above.

7. Use the program uploaded viz. Test7Assignment.c and explain all the errors flagged of by splint.

8. Use the program uploaded viz. Test8Assignment.c and explain all the errors flagged of by splint.