

# CS301P Compiler Design Laboratory Exercises Lab#10

Date: October 31, 2023

## Objectives

- To enhance the previous lab exercises with multi-way selection statement (switch-case).

## Exercises

1. Enhance your previous lab's submission with switch-case statement. You may require to come with CFG and corresponding semantic actions to translate **switch-case** statements to equivalent three address code as shown in following figures. Please refer to the textbook for further reference.

```
switch ( E ) {  
    case  $V_1$ :  $S_1$   
    case  $V_2$ :  $S_2$   
    ...  
    case  $V_{n-1}$ :  $S_{n-1}$   
    default:  $S_n$   
}
```

Figure 6.48: Switch-statement syntax

```
code to evaluate E into t  
goto test  
L1: code for  $S_1$   
goto next  
L2: code for  $S_2$   
goto next  
...  
Ln-1: code for  $S_{n-1}$   
goto next  
Ln: code for  $S_n$   
goto next  
test: if t =  $V_1$  goto L1  
      if t =  $V_2$  goto L2  
      ...  
      if t =  $V_{n-1}$  goto Ln-1  
      goto Ln  
next:
```

Figure 6.49: Translation of a switch-statement

```
witch (ch) {  
    case 1:  
        a = b + c;  
        break;  
    case 2:  
        a = b - c;  
        break;  
    default:  
        a = b * c;  
}  
a = b / d;
```

should be translated to

```

    ifFalse ch = 1 goto L1
        t0 = b + c
        a = t0
        goto out
L1:
    ifFalse ch = 2 goto L2
        t1 = b - c
        a = t1
        goto out
L2:
        t2 = b * c
        a = t2
out:
        t3 = b / c
        a = t3

```

## Submission Guidelines

- The name of the parser executable should be *parser*
- The respective lex and yacc programs can have the same name but with the extension *.l* and *.y*, respectively.
- The names for the given program should be *prob1* of course with appropriate extensions.
- Submit also the 4 test cases that you have tried. The files should be named *test1.c*, ... *test4.c*
- Other submission requirements remain same as week#1.

## Evaluation Guidelines

Same as week#1

## Academic Honesty

Same as week#1