



Lab 3: Allocation

Subtasks in allocation

■ Unit selection

- ◆ selects the number and types of different functional and storage units form the RT component library

■ Operation-to-FU assignment (Functional-unit binding)

- ◆ map a computation to an FU of an appropriate type

■ Value-to-register assignment (Register binding)

- ◆ Values with nonoverlapping lift times can share the same location

■ Transfer-to-wire assignment (Interconnection binding)

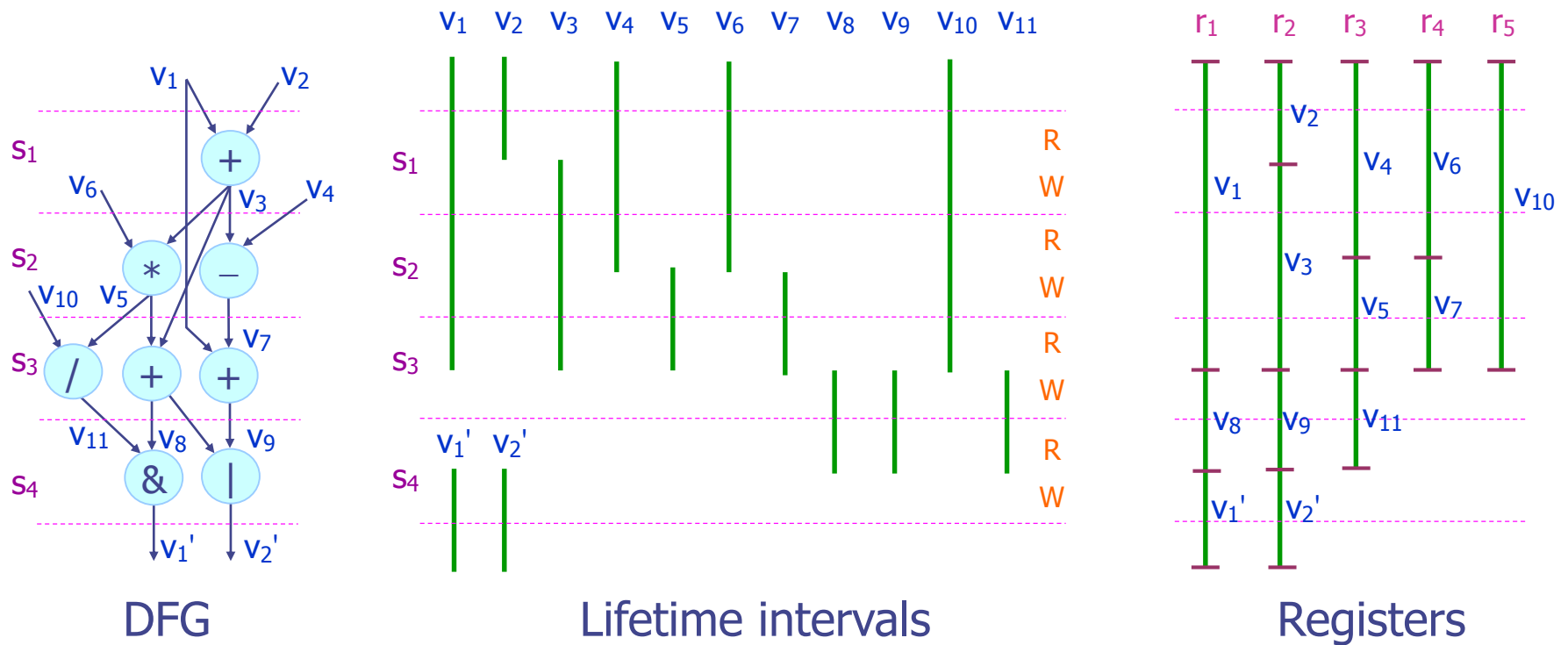
- ◆ Mux-oriented architecture
 - ⊕ Multiplexers: connect to the unit receiving the transfer

■ Wire to FU-port assignment

- ⊕ Commutative operations

Left-Edge Algorithm (1/3)

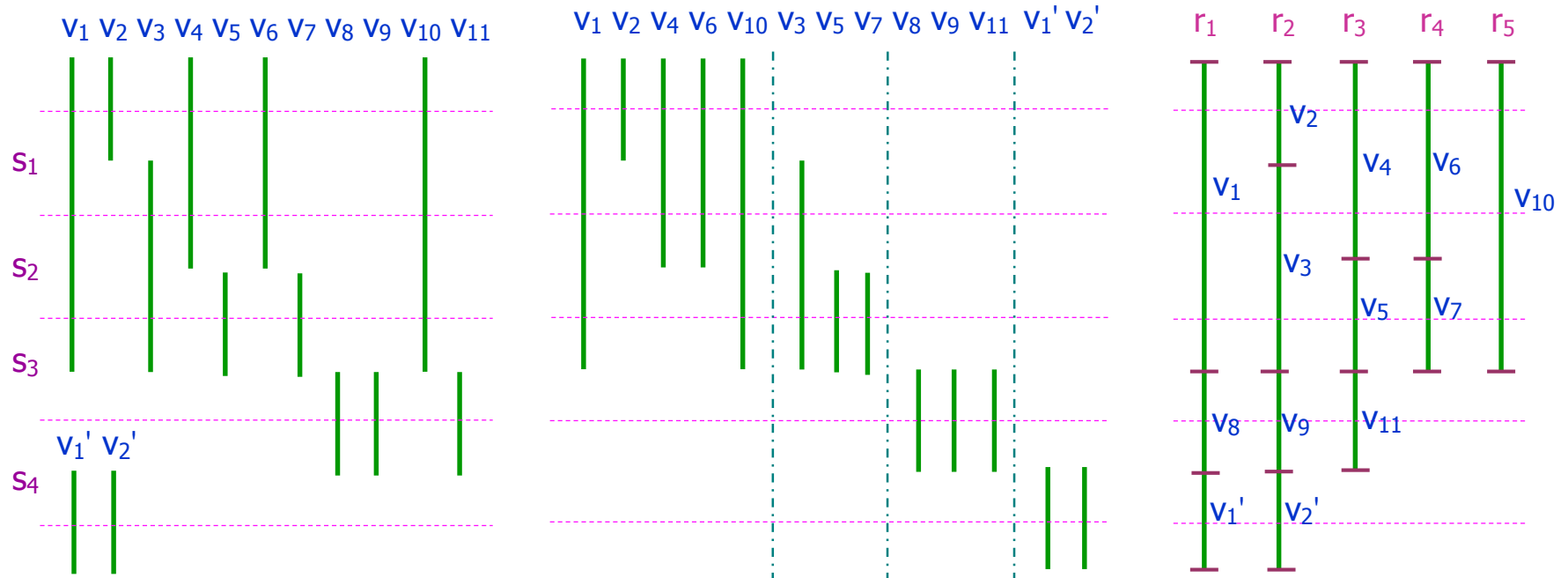
Left-Edge Algorithm for Register Binding



Left-Edge Algorithm (2/3)

```
for all  $v \in L$  do MAP[v]=0; endfor
SORT(L); /* sort the variables in L in ascending order with their start times */
reg_index = 0;
while  $L \neq \emptyset$  do
    reg_index = reg_index + 1;
    curr_var = FIRST(L);
    last = 0;
    while curr_var  $\neq$  null do
        if Start(curr_var)  $\geq$  last then
            /* share the register */
            MAP[curr_var] = reg_index;
            last = End(curr_var);
            temp_var = curr_var;
            curr_var = NEXT(L, curr_var);
            DELETE(L, temp_var);
        else
            curr_var = NEXT(L, curr_var);
        endif
    endwhile
endwhile
```

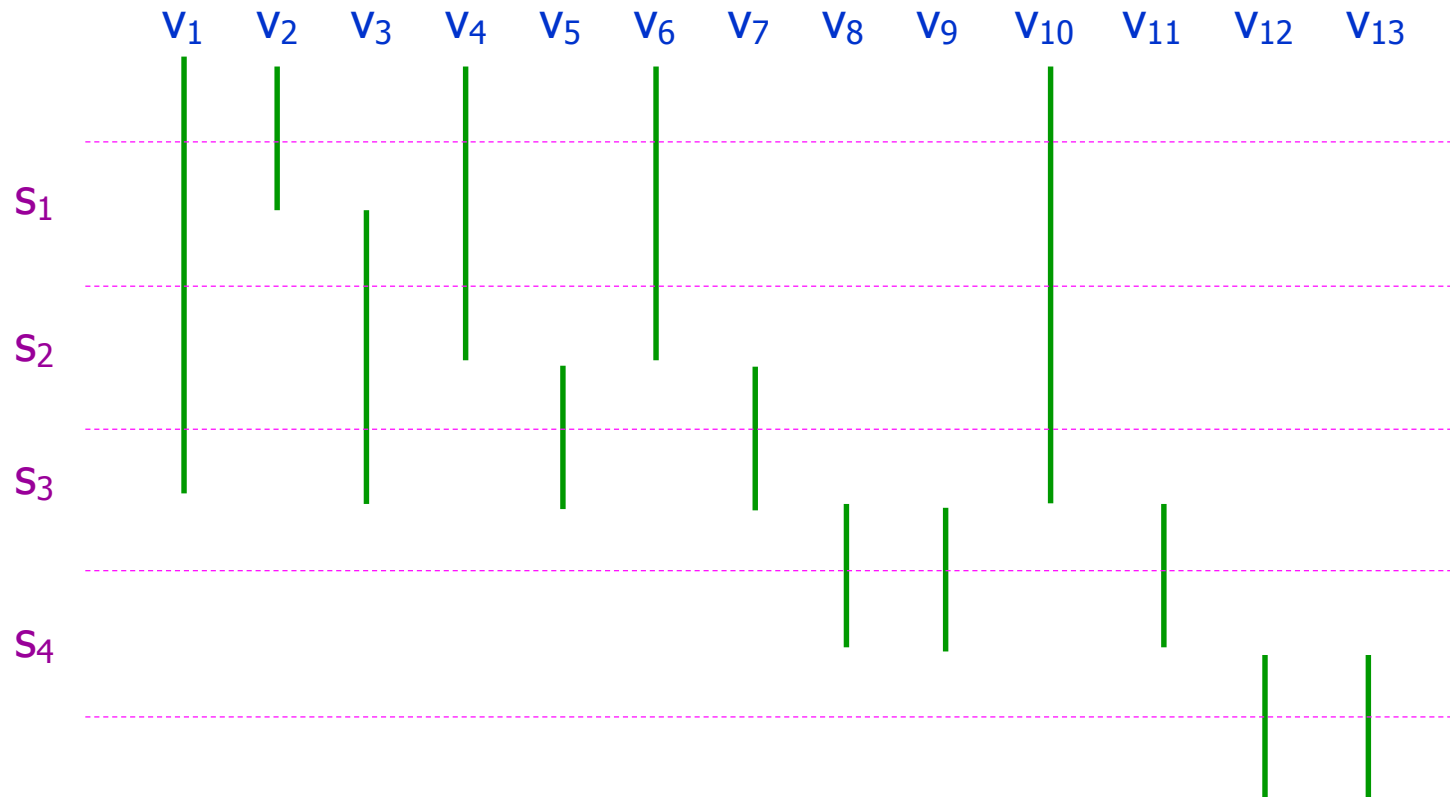
Left-Edge Algorithm (3/3)



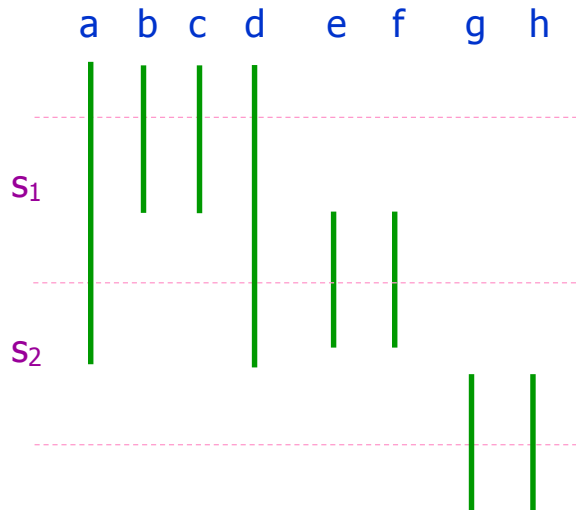
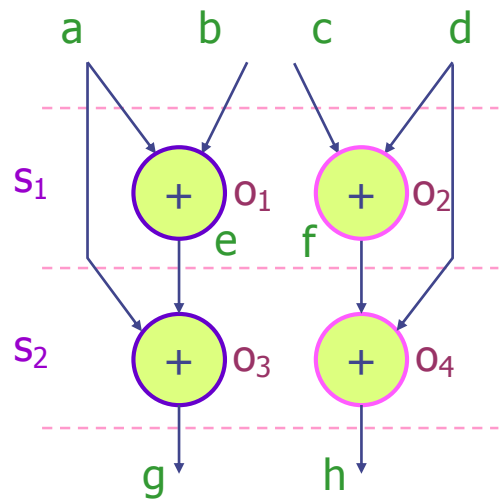
Lab 3: Allocation

- 下載並安裝 Dev-C++
- 參閱 Left-Edge Algorithm for Register Binding 範例
- 撰寫 Left-Edge Algorithm 的 C/C++ 程式
- 以 Left-Edge Algorithm 程式進行 Lift_time1 以及 Lift_time2 的 Register Binding
- 以 Left-Edge Algorithm 程式進行 Lift_time of RGB to YUV 的 Register Binding
- 繳交程式及實驗報告

Lift_time1



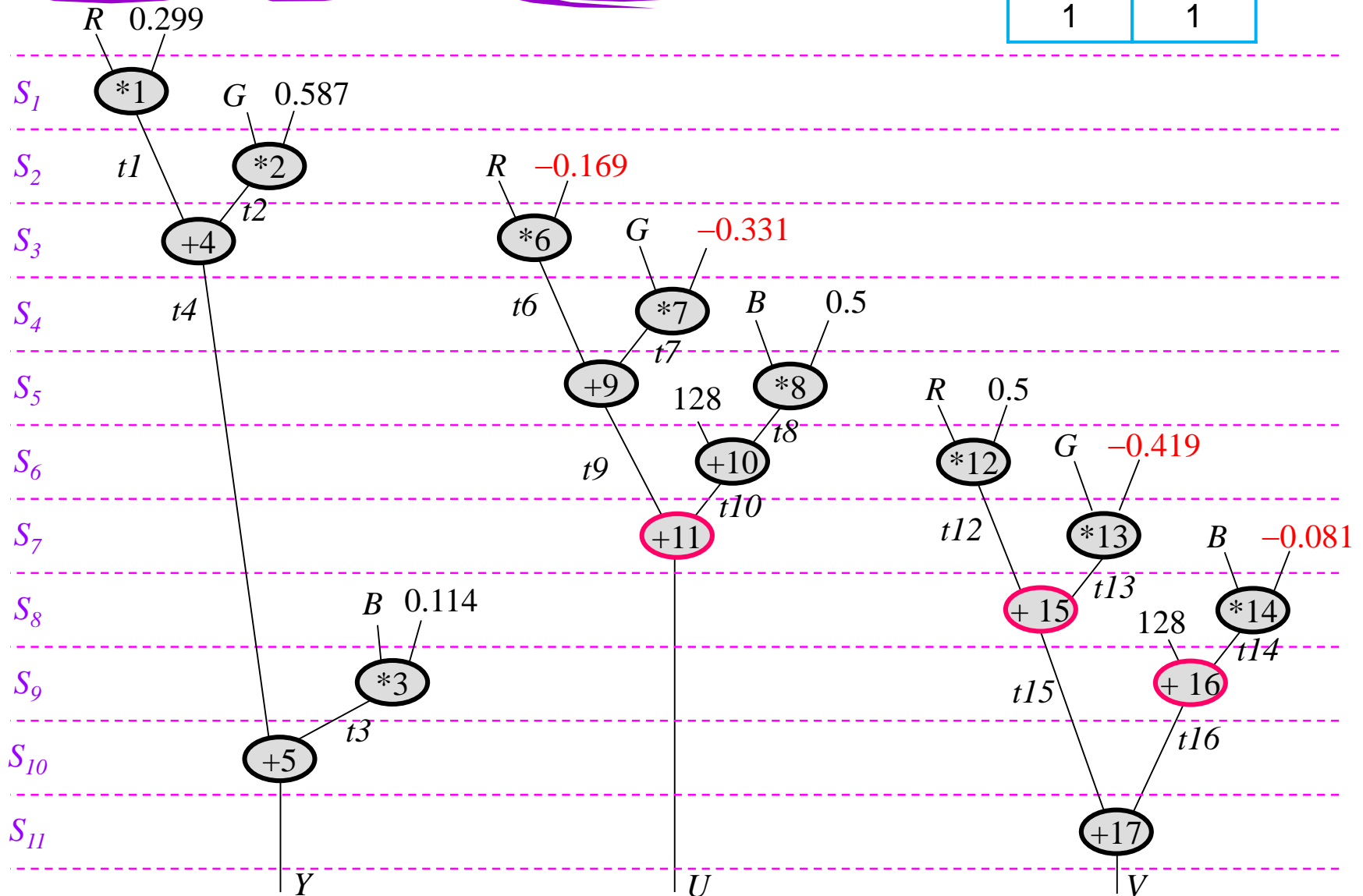
Lift_time2



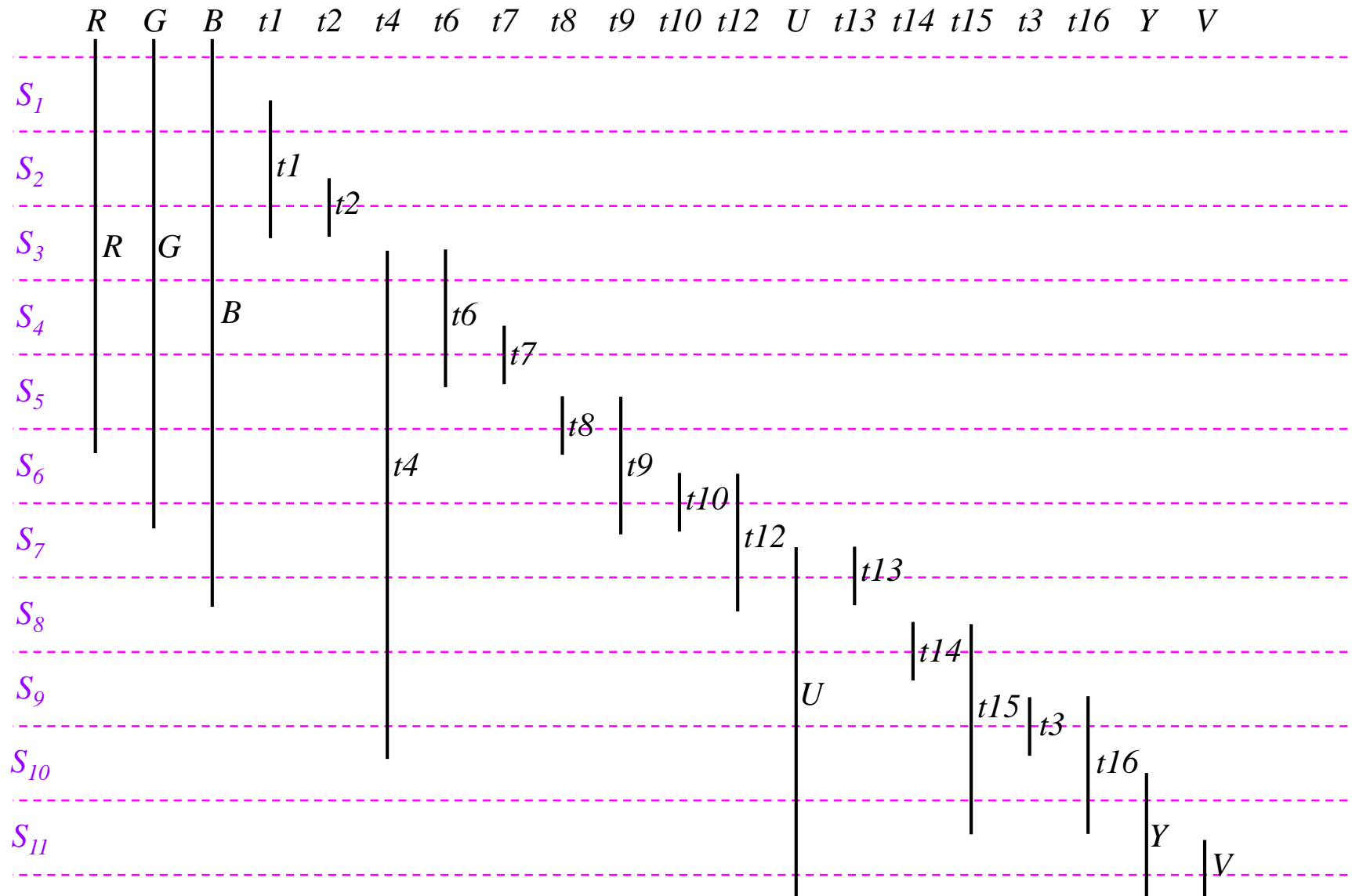
Scheduling of RGB to YUV

Resource constraint:

*	+
1	1



Lift_time of RGB to YUV



實驗報告+程式碼

- 實驗報告及程式碼以壓縮檔繳交，每位同學均須繳交
- 實驗報告壓縮檔請以實驗編號及自己的學號姓名命名，例如：**Lab3_M999999999陳小華.rar**，於規定時間內上傳至“中山大學網路大學-作業評量區”繳交
- 實驗報告內容包含
 - ◆ 實驗主題、實驗日期、學號姓名
 - ◆ 實驗內容、過程及結果
 - ⊕ 實驗內容、程式簡要說明...
 - ⊕ 實驗畫面、Register Binding 結果...
 - ⊕ 實驗結果及分析
 - ◆ 實驗心得