Technische Universität München *Summer Semester 08*
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Compiler Construction & Virtual Machines

Exercise Sheet 2

Deadline: 28. April 2008, 12:00, during the lecture or in room 02.07.053

Exercise 1: *Structs and arrays* *5 Points*

```
int j;

struct node {
  int data;
  struct node* next;
};

struct node cycle[3];

for(j=0;j<3;j=j+1){
  cycle[j].data=j;
  cycle[j].next=&cycle[(j+1) % 3];
}
```

a) Give the mapping ρ, which shows how the array of structs in this code is allocated on the stack.

b) Write a VAM executable .cma file for the above code segment. (CMa has a 'mod' operator).

Exercise 2: *Statements on the register machine* *10 Points*

Recall the unbounded register CMa from the last exercise sheet. It stored intermediate values in registers instead of on the stack. Extend the translation scheme from the last exercise from expressions to now translating the if, while and for-statements. The intermediate values, e.g., the result of evaluating the boolean expression should again be stored in registers.

Define the *code* function that performs this translation, and for completion copy your answers from last week, which you may improve, to give the entire translation scheme and virtual machine instructions. *Register allocation should be static.*