

# Unit 8 - Week 6

## Course outline

How does an NPTEL online course work?

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Week 6

Virtual Machines - What and Why?

The VM Instruction Set Architecture

The execution of a VM Program

How powerful is the VM?

Deep Understanding of VM ISA using VM Emulator

Project 07: VM ISA to HACK Mnemonic Translation

Project 07: Demo

Quiz : Assignment 6

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## Assignment 6

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

**Due on 2020-03-11, 23:59 IST.**

1) If we have  $m$  programming languages and  $n$  hardwares, what is the number of compilers needed in the **absence** of an intermediate virtual machine? 1 point

- $m + n$   
  $m * n$   
  $m^n$   
  $\log_2(mn)$

No, the answer is incorrect. Score: 0

Accepted Answers:  $m * n$

2) If we have  $m$  programming languages and  $n$  hardwares, what is the number of compilers needed in the **presence** of an intermediate virtual machine? 1 point

- $m + n$   
  $m * n$   
  $m^n$   
  $\log_2(mn)$

No, the answer is incorrect. Score: 0

Accepted Answers:  $m + n$

3) What will be the (integer) value removed using the stack during the `pop` command highlighted in the given code? (Assume syntax used in Module 6.1)

```

push 3
push 4
add
push 2
lt // less-than command
pop //<-----This pop command
    
```

No, the answer is incorrect. Score: 0

Accepted Answers: (Type: Numeric) 0

4) Given the names of the following files used during the entire compilation flow, identify the order in which they are processed. 1 point

1. Program.hack      2. Program.vm      3. Program.asm      4. Program.jack

- 1,3,2,4  
 4,3,1,2  
 4,2,3,1  
 2,1,3,4

No, the answer is incorrect. Score: 0

Accepted Answers: 4,2,3,1

5) Which of the following is(are) CORRECT for stack based VM machine? 1 point

- VM commands are executed with value(s) at the top of the stack (last inserted).  
 VM commands are executed with value(s) at the bottom of the stack (first inserted).  
 The values using which VM commands should be executed can be accessed using the stack pointer.  
 `sub` command in VM is a memory access command.

No, the answer is incorrect. Score: 0

Accepted Answers: VM commands are executed with value(s) at the top of the stack (last inserted). The values using which VM commands should be executed can be accessed using the stack pointer.

6) Which of the following HACK reserved variables and the address of segment they store are mapped correctly? 1 point

- THIS - array access  
 THAT - fields in an object  
 ARG - arguments of function  
 LCL - local variables  
 THIS - fields in an object  
 THAT - array access

No, the answer is incorrect. Score: 0

Accepted Answers: ARG - arguments of function LCL - local variables THIS - fields in an object THAT - array access

7) Which of the following is different from the rest? 1 point

- `goto symbol`  
 `return`  
 function `functionname` nLocals  
 call `functionname` nArgs

No, the answer is incorrect. Score: 0

Accepted Answers: `goto symbol`

8) How many entries does the `pointer` segment contain? 1 point

No, the answer is incorrect. Score: 0

Accepted Answers: (Type: Numeric) 2

9) Which of the following is(are) ALWAYS INVALID VM commands? 1 point

- `pop constant 1`  
 `push local 0`  
 `push constant 1`  
 `pop pointer 2`

No, the answer is incorrect. Score: 0

Accepted Answers: `pop constant 1` `pop pointer 2`

10) Which of the following VM command is equivalent to the given HACK assembly mnemonic? 1 point

```

@SP
A=M-1
M=-M
    
```

- `add`  
 `sub`  
 `neg`  
 `push`  
 `pop`  
 `not`

No, the answer is incorrect. Score: 0

Accepted Answers: `neg`