

COSC 2P90 MIDTERM TEST
OCTOBER 18TH, 2005

Time: 5:00 p.m. – 6:00 p.m.

Total marks: 20

Total pages: 2

This is a *closed-book* exam

No calculators are permitted

Answer all questions *in your exam booklet*.

Answer any **4** of the following **5** questions. If you answer all **5** questions just the first **4** answers in your booklet will be marked. Be sure to answer all parts of the questions you choose. Each question is worth a total of 5 marks.

1. Consider the following Java loop where *c* and *d* are arbitrary sequences of statements. Give an alternative implementation not using a `break` or `continue` statement (5 marks).

```
while (true) {  
    c;  
    if (x<0) break;  
    d;  
};
```

2. Explain the differences between static scope and dynamic scope (2 marks). Consider the following program written Pascal syntax. Determine which value is printed with static scope (1 mark) and with dynamic scope (2 mark). In each case, you must explain how that value is obtained.

```
program prog;  
    var x : Integer;  
  
    procedure p;  
    begin  
        x := x + 1;  
    end;  
  
    procedure q;  
        var x : Integer;  
    begin  
        x := 1;  
        p;  
        print(x);  
    end;  
  
begin  
    x := 3;  
    q;  
end.
```

3. Consider the following loop written in Pascal-like syntax. Explain 2 different possibilities for the calculation of the final value and increment of the loop index i (2 marks). What is the value of j after executing the loop in both alternatives (3 marks)?

```
j := 1;  
for i := 1 to 4*j step j+1 do  
    j := j+5;  
end;
```

4. Discuss the relative advantages and disadvantages of static typing vs. dynamic typing (5 marks).
5. Differentiate between independent compilation as in FORTRAN and separate compilation as in Ada and Java (3 marks). Ada separates a package into separate specification and body parts, how does this reduce recompilation (2 marks)?