Assignments are due on the due date before class and have to include this cover page. Plagiarism in assignment answers will not be tolerated. By submitting their answers to this assignment, the authors named above declare that its content is their original work and that they did not use any sources for its preparation other than the class notes, the textbook, and ones explicitly acknowledged in the answers. Any suspected act of plagiarism will be reported to the Faculty's Academic Integrity Officer and possibly to the Senate Discipline Committee. The penalty for academic dishonesty may range from failing the course to expulsion from the university, in accordance with Dalhousie University's regulations regarding academic integrity.
**Question 1 (10 marks)** Consider the following C program:

```c
void f()
{
    int i;
    printf("%d ", i++);
}

int main()
{
    int j;
    for(j = 1; j <= 10; j++) f();
    return 0;
}
```

The behaviour of this program is undefined because the local variable `i` in function `f()` is never initialized. Nevertheless, the program will print `0 1 2 3 4 5 6 7 8 9` on many systems. Suggest an explanation.

**Question 2 (15 marks)** Consider the following templated C++ code:

```cpp
template <class T>
void swap(T &a, T &b)
{
    T c = a; a = b; b = c;
}
```

This function swaps its two arguments, that is, after calling `swap(x, y)`, `x` stores `y`'s previous value, and `y` stores `x`'s.

(a) A simple translation into Java looks as follows:

```java
public static <T> void swap(T a, T b)
{
    T c = a; a = b; b = c;
}
```

Does this function do what it is expected to do? Explain.

(b) Provide a Java implementation of `swap()` that works for arguments that are objects. Is your implementation applicable to objects of any class or only to objects that implement a particular interface?

(c) Is it possible to write a Java implementation of `swap()` that also works for built-in types, such as `char` or `int`? Justify your answer.