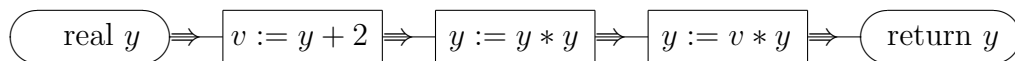


MAE113 DISCRETE TECHNIQUES FOR COMPUTING

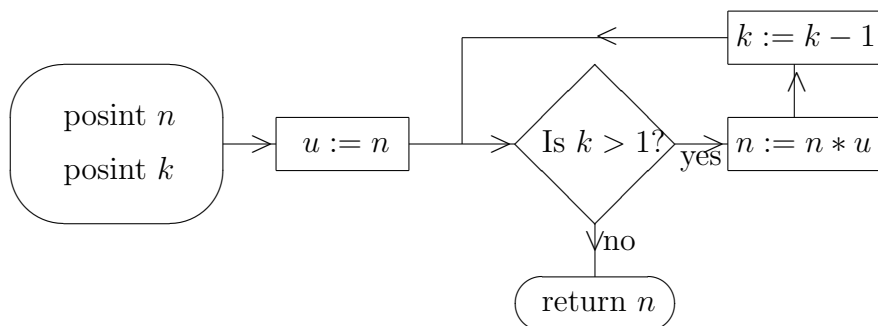
Coursework 7—to be handed in by noon, Wednesday 24/11/2010.

Write your name and student number at the top of your assignment before handing it in. You should attempt all questions because as little as one question might be marked.

1. What function is calculated by the following algorithm?



2. Consider the following algorithm:



- (a) Walk through the algorithm and find its output when $n = 4$ and $k = 5$ (you will need to track all three variables).
 - (b) What function does this algorithm calculate? Is it a polynomial function?
3. Carry out the following polynomial multiplications (simplify the answer as much as possible):
 - (a) $(3x^3 + 5x^2 + x + 3) \cdot (x^2 + 3x + 2)$;
 - (b) $(x^3 + x^2 + x + 1) \cdot (x - 1)$.
 4. Simplify the following:
 - (a) $\frac{1001!}{1000!}$,
 - (b) $\frac{7!}{4!}$,
 - (c) $\frac{(n+3)!}{(n+2)(n+1)!}$.
 5. Without using a calculator, or performing any calculation whose answer exceeds 100, show that $6! \times 7! = 10!$.