

## MA U11601 Quiz 01 8/10/20 due midnight 11/10/20

Answer any 3 questions. Submit them through Blackboard as pdfs, either handwritten and scanned, or typeset. They should be submitted before midnight on Monday 11 October. If more than three answers are submitted, only the first three will be marked. All questions carry 20 marks.

**Show all work.** That is, where an answer requires some calculation, show the calculation.

**Plagiarism.** If copying is detected, all those involved will lose credit, irrespective of who copied from whom.

**Question 1.** Show what this program does, step by step, as in Section 3.2 of the web notes.

```
#include <stdio.h>
int main()
{ int i; double x;
  x = 1;
  for (i=0; i<3; ++i)
  { x = x+x;
  }
  printf("Now x is %f\n", x);
}
```

**Question 2.** If you can, compile and run this program, show the output, and say which  $(k, x)$  is correct.

If you do not yet have ready access to a C compiler, say what the final values of  $k$  and  $x$  ought to be.

```
#include <stdio.h>
int main()
{ int k; double x;
  k = 1; x = 1;
  while ( k > 0 )
  { k = k+k;
    x = x+x;
  }
  printf("k %d x %f\n", k, x);
}
```

**Question 3.** In the following code, when  $n$  is 15, the final value of `e11` is 3. (i) What gets printed if you change  $n$  from 15 to 100? (ii) For general  $n \geq 1$ , what gets printed as `e11`? That is, the final value of `e11` is a certain function of  $n$ : what is that function?

```
#include <stdio.h>
int main()
{
  int n, nn, e11;
```

```

n = 15; nn = n; ell = 0;
while ( nn > 1 )
{ ++ ell; nn = nn/2;
}
printf("n is %d, ell is %d\n", n, ell );
}

```

**Question 4.** Show the output to the code below, and explain it.

```

#include <stdio.h>
int main()
{
    int m; double x;
    m = 17; x = 17;
    printf("m is %d, m - 3 * (m/3) is %d\n", m, m - 3 * (m/3) );
    printf("x is %f, x - 3 * (x/3) is %f\n", x, x - 3 * (x/3) );

    m = -17; x = -17;
    printf("m is %d, m - 3 * (m/3) is %d\n", m, m - 3 * (m/3) );
    printf("x is %f, x - 3 * (x/3) is %f\n", x, x - 3 * (x/3) );
}

```

**Question 5.** (i) Show what this program does, step by step, as in Section 3.2 of the web notes. (ii) For general  $n$ , what do the answers signify? Details are not required.

```

#include <stdio.h>

int main()
{ int x, i, n;
  x = 0; i=0; n = 3;
  while ( x < n )
  { x = x + 2*i + 1;
    i = i+1;
  }
  if ( x == n )
    printf("Yes\n");
  else
    printf("No\n");
}

```