



(National Council for Vocational Awards)



MARKING SCHEME & SOLUTIONS
Computer Programming C20013

Theory Examination 2006

Duration: Two Hours

INSTRUCTIONS TO CANDIDATES:

*Answer any **three** questions*

All questions carry equal marks

Answer the questions using the spaces in this exam booklet

Return this question & answer paper when finished

This written exam counts as 40% of the total module

NAME (PRINT): _____

PPS NUMBER: _____

DATE: _____

**MARKING SCHEME
& SOLUTIONS**

Question 1. Total 40 marks.

(a) This program contains 4 errors that will stop it from compiling. List the errors. **20 marks 5 each**

```
include <stdio.h>
int loopy;
main ()
{
  looper = 1;
  printf ("+-----+\n");
  while (loopy <= 8)
  {
    printf ("|          |\n");
    loopy+;
  }
  printf ("+-----+\n");
}
```

1	<i>#include <stdio.h></i>
2	<i>loopy vs looper used as variable name</i>
3	<i>Closure of inverted commas in printf</i>
4	<i>loopy+ instead of loopy++</i>

(b) What is a variable used for? **10 marks**

To store data as the program runs, as well as to allow that data to be changed as required.

(c) What is the difference between an integer (**int**) and a float (**float**) variable? Give a sample of each type of data. **10 marks**

One stores integer data – whole numbers (such as 2 or 56 or -4563); the other stores decimal data such as -1.02 or 45.9 or 2345.67

Question 2. Total 40 marks.

(b) Write the general form of the **if...else** statement: **10 marks**

```
if (condition)
{
    action when condition is true;
}
else
{
    action when condition is false;
}
```

(b) Write the general form of the **while** statement: **10 marks**

```
initialize control variable;
while (terminating condition not met, based on control variable)
{
    loop action - the function of the loop;
    progress towards loop termination, based on control variable change;
}
```

(c) The following C code will compile and run but will not generate the desired output. Why?

20 marks

```
#include <stdio.h>
// A sample program.
// This program should write out the letters a..z
// of the alphabet, one on each line.
int controlvar;
char alpha; this variable has no function or effect - a distraction!
main ()
{
    controlvar = 97;
    while (controlvar <= 122);
    {
        // This line converts and then writes the character
        printf ("%c\n", controlvar);
        controlvar++;
    }
}
```

The while statement has a semi-colon at the end that will cause an infinite loop.

Question 3. Total 40 marks.

(a) Indicate the values in each of the variables **a**, **b** and **c** after this program finishes:

10 each 30 marks

```
#include <stdio.h>
main ()
{
  int a, b, c, lv;
  lv = 1;
  // Don't loop when lv is ten
  while (lv != 10)
  {
    a = lv;
    b = lv * 2;
    // Add 1 to lv each time
    lv++;
  }
  c = a * b;
}
```

<i>Variable</i>	<i>Value</i>
a	9
b	18
c	162

(b) What screen output is generated by this program line: **10 marks**

```
printf ("%c%c%c%c%c\n%c%c%c%c%c%c\n",
        68, 111, 110, 39, 116, 80, 97, 110, 105, 99, 33);
```

Dont,

Panic!

Question 4. Total 40 marks.

(a) Write a C loop to read in an array of 30 numeric variables and then write out the total (sum) and the average of the numbers which have been read in.

30 marks

'Program' not specified to be written - just a loop; therefore assume the variables are declared and any other program essentials are done.

```
total = 0;
control = 1;
while (control <= 30)
{
    printf ("Please enter a number: ");
    scanf ("%d", &anum);
    total = total + anum;
    control++;
}
average = total / 30;
printf ("The total of the numbers is: %d and the average is: %d",
total, average);
```

(b) The control variable for a **while** loop should appear in a program not less than four times. List those times. **10 marks 2.5 each**

1	declare
2	initialize
3	compare (for termination)
4	progress (ie increment, decrement)

Figure 1. The ASCII table.

			032 SP	033 !	034 "	035 #
036 \$	37.00%		038 &	039 '	040 (041)
042 *		043 +	044 ,	045 -	046 .	047 /
048 0	049 1		050 2	051 3	052 4	053 5
054 6	055 7		056 8	057 9	058 :	059 ;
060 <	061 =		062 >	063 ?	064 @	065 A
066 B	067 C		068 D	069 E	070 F	071 G
072 H	073 I		074 J	075 K	076 L	077 M
078 N	079 O		080 P	081 Q	082 R	083 S
084 T	085 U		086 V	087 W	088 X	089 Y
090 Z	091 [092 \	093]	094 ^	095 _
096 `	097 a		098 b	099 c	100 d	101 e
102 f	103 g		104 h	105 i	106 j	107 k
108 l	109 m		110 n	111 o	112 p	113 q
114 r	115 s		116 t	117 u	118 v	119 w
120 x	121 y		122 z	123 {	124	125 }
126 ~	127					
Printable alphanumeric and punctuation characters used in normal document text						

