國立高雄大學 112 學年度轉學招生考試試題(轉二年級)

科目：計算機概論
考試時間：80 分鐘

系所：
資訊工程學系(無組別)
本科原始成績：100 分

是否使用計算機：否

一、選擇題 **Choose the best answer for each question (20%)**

( ) 1. Convert the decimal number 35.125 to the binary number _____.
(a) 100011.01 (b) 10011.001 (c) 100011.001 (d) none of the above

( ) 2. Assuming that `b` is an array and `bPtr` is a pointer to that array, what expression refers to the address of the third element?
(a) `bPtr[2]` (b) `*b[2]` (c) `(bPtr+2)` (d) none of the above

( ) 3. Change the 4-bit two's complement number $(1110)_2$ to decimal number
(a) -6 (b) -2 (c) 14 (d) none of the above

( ) 4. _____ is an example of a functional language.
(a) LISP (b) Prolog (c) C (d) Java

( ) 5. The *compile* stage takes place when _____.
(a) the C program is translated into machine language code
(b) the program is placed in memory
(c) sets of the program are formed sequentially
(d) the object code is linked with code for functions in other files

二、填充題 **Please fill in the following blanks (40%)**

1. HanoiTower problem

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```
#include <stdio.h>
 // C recursive function to solve tower of hanoi puzzle
void HanoiTower(int n, char from_post, char to_ post, char aux_ post)
{
      if (n == 1)
      {
            printf("\n Move disk 1 from post %c to post %c", from_ post, to_ post);
            return;
      }
      HanoiTower(n-1, _________, ________, to_ post);
      printf("\n Move disk %d from post %c to post %c", n, from_ post, to_ post);
      HanoiTower(_______, ________, ________, from_ post);
}
 int main()
{
      int n = 4; // Number of disks
      HanoiTower(n, 'A', 'C', 'B');    // A, B and C are names of posts
      return 0;
}
```

2. If we run the below program (in Fig.1) with the input “153”, then the output is_____

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```
#include<stdio.h>
 int main()
{
int n,r,sum=0,dd=1,temp=1;
printf("Enter the number:");
scanf("%d",&n);
while(n>0)
{
r=n%10;
for (i=1; i<= dd; i++)
{
temp= temp*r;
}
sum=sum+temp;
n=n/10;
dd++;
temp=1;
}
printf("%d",sum);
return 0;
}
```

Fig.1

```
#include<stdio.h>
 int main()
{
int n, rr=0, rem;
printf("Enter a number: ");
   scanf("%d", &n);
   while(n!=0)
   {
        rem=n%10;
        rr=rr*10+rem;
        n/=10;
   }
   printf("%d",rr);
return 0;
}
```

Fig.2

```
#include<stdio.h>
 int main()
{
int n, sum=0;
scanf("%d",&n);
for (i=1; i<= n; i++)
{
for (j=1; j<= i; j++)
{
If (j % 2 == 1) sum= sum+ j;
else sum= sum- j;
}
}
printf("%d",sum);
return 0;
}
```

Fig.3

3. If we run the above program (in Fig.2) with the input “1234”, then the output is_____.
4. (a) If we run the above program (in Fig.3) with the input n=6, then the output is_____.
   (b) If we run the above program (in Fig.3) with the input n=k,where k is an odd number, then the output is_____.
5. Show the Excess_3 representation of the decimal number -0.625 :_____
   The format of Excess_3: the sign occupies 1 bit (0 for positive and 1 for negative), the exponent occupies 3 bits (using a bias of 3), the mantissa occupies 4 bits (unsigned number).

背面尚有試題

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三、問答題 **Problems (40%)**

1. Given an array A with n integers $A[0], A[1], \ldots, A[n-1]$, write a C program to find the maximum subsequence sum $\sum_{k=i}^{j} A_k$, where $0 \le i \le j \le n-1$.
   For example: $A[0] = -1, A[1] = 9, A[2] = -3, A[3] = 8, A[4] = -1$ output the maximum subsequence sum (9)+(-3)+(8) = 14. (If you have many programs, choose the program with less running time.)
2. Given an integer k, write a C program to find the minimum number of Fibonacci numbers whose sum is equal to k.
   For example: The Fibonacci numbers are: 1, 1, 2, 3, 5, 8, 13, ... If the input k = 7, we have 2 + 5 = 7. Then, we output 2.

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一、選擇題 **Choose the best answer for each question** (每題 3 分，共 30 分)

( ) 1. Find $\lim_{x\to 0}\frac{tanx}{1-e^{-x}}$. (a) 0; (b) 1; (c) -1; (d) ∞.

( ) 2. Find the limit: $\lim_{x\to 0}\frac{23x}{\sqrt{23x+9}-3}$. (a) 23; (b) 6; (c) 1; (d) 0.

( ) 3. Find the slope of the tangent line to the graph of the function $f(x)=e^x+23x$ at (0, 23).
(a) 23; (b) 0; (c) 24; (d) no answer

( ) 4. Find $f''(0)$ if $f(x)=xsin(3x)$. (a) 0; (b) -6; (c) 1; (d) 6.

( ) 5. Given $y=e^{23\sqrt{2x}}$, find $\frac{dy}{dx}$.
(a) $e^{23\sqrt{2x}}$; (b) $\frac{23}{2\sqrt{2x}}e^{23\sqrt{x}}$; (c) $\frac{23}{\sqrt{2x}}e^{23\sqrt{2x}}$; (d) $\frac{23}{2\sqrt{x}}e^{23\sqrt{x}}$.

( ) 6. Given $y=\arctan(x^3)$, find $\frac{dy}{dx}$.
(a) $\frac{3x^2}{\sqrt{1+x^6}}$; (b) $\frac{3}{\sqrt{1+9x^6}}$; (c) $\frac{1}{1+9x^2}$; (d) $\frac{3x^2}{1+x^6}$.

( ) 7. Find the limit: $\lim_{x\to-\infty}(\frac{23x+1}{\sqrt{x^2-x}})$. (a) 23; (b) ∞; (c) 0; (d) -23.

( ) 8. $F(x)=\int_{23}^{x^4}\sin\sqrt{t}dt$. Find $\frac{dF(x)}{dx}$. (a) $\sin x^2$; (b) $\sin x^4$; (c) $4x^3\sin x^2$; (d) $4x^3\cos x^2$.

( ) 9. Find $\int\frac{1}{x^2+8x+41}dx$.
(a) $\frac{1}{5}\text{arcsec}\frac{x+4}{5}+C$; (b) $\arctan\frac{x+4}{5}+C$; (c) $\frac{1}{5}\arctan\frac{x+4}{5}+C$; (d) $\text{arccot}\frac{x+4}{5}+C$.

( ) 10. Find $\int_4^5\frac{2x}{(x^2-23)^2}dx$. (a) divergence; (b) $-\frac{9}{14}$; (c) $\frac{9}{14}$; (d) 0.

二、填充題 **Please fill in the following blanks** (每題 5 分，共 25 分)

1. For $f(x)=26-\frac{25}{x}$, find all values of c in the open interval (1, 25) such that $f'(c)=\frac{f(25)-f(1)}{25-1}$.
Find c =_____

2. Find $\int_0^1\frac{x^2+x+1}{x+1}dx$ = _____

3. Find $\int_0^{\pi}(\cos x)^6dx$ = _____

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4. Find $\int_0^{\pi/6} 12(\sec x)^3 dx =$ _____
5. Find the arc length of the curve $x = f(t) = \int_0^{2t}\left(\sqrt{sinz}\right) dz,\ y = g(t) = \int_0^{2t}\left(\sqrt{4+3sinz}\right) dz$ from $t = 0$ to $t = \pi$. _____

三、計算題 **Problems** (每題 15 分，共 45 分)

1. Find the volumes of the solids generated by revolving the region bounded by $f(x) = \sqrt{x} + 6$ and $g(x) = \frac{1}{2}x + 6$ about the x-axis.
2. Find the volume of the solid region bounded below by the paraboloid $z = 2 - x^2 - y^2$ and above by the plane $z = 2 - y$.
3. Evaluating the line integral $\int_C 6xydx + (3x + 3y)dy$ by using Green'sTheorem, C: bounded of the region lying between the graphs of $y = 0$ and $y = 1 - x^2$.