CS110 - Introduction to Computing

Tutorial - I

January 31, 2008

1. Expand the following
   (a) CPU
   (b) ASCII
   (c) IO
   (d) RAM

2. What is the output of the following program?

```
#include <stdio.h>
int main(){
int a;
a = 1;
a = 2;
a = 3;
printf("%d %d %d \n",a,a,a);
return 0;}
```

3. Given that p, q and r are declared as integers in a C program. Also given that $p = 12$ and $q = 16$, what are the possible values of r such that the following expressions in C language, $p/q+r$ and $4*(p/(q-r))$ evaluate to the same value?

4. Will your answer change if the expressions are $p/q+r$ and $4*p/(q-r)$. If so, what would be the change?

5. For example, $(95)_{10}$ stands for 95 to the base 10. In other words, it denotes $9\times10^1+5\times10^0$. For what values(s) of a will $(69)_a = (127)_8$.

6. What will be the output of this program?

```
#include <stdio.h>
int main(){
int i;
i = 076;
printf("The value of i id %d\n",i);
return 0; }
```

7. Convert the following to binary:
   (a) $(712)_8$
   (b) $(ABC)_{16}$

8. Evaluate:
   (a) $(\_\_\_\_)_{10} = (AB)_{16} + (43)_8$
   (b) $(EC9FA)_{16} - (8137)_{10} = (\_\_\_)_8 = (\_\_\_)_2$

9. In the *OuTel* computer made by Prof. Nutts, any integer A is represented using 13 bits. What would be the range of values if:
   (a) A is an unsigned integer.
   (b) A is a signed integer.

10. A matrix A of integers with dimension 10×13 is stored in a row-major order starting at location `0x1000`, in memory. In which memory locations the entry $A[2][3]$ shall be stored? Assume each integer is 4 bytes and every memory location stored one byte.

11. What would be the location of $A[2][3]$ in the above problem if, A was stored in column-major order?

12. What are the errors in the following C code segment?

```
if(q >= r)
 printf("q is greater then or equal to r\n");
 p = q + r;
else
 printf("r is less than q\n");
 p = q - r;
```

13. What is the output of the following C program?

```
#include <stdio.h>
main() {
printf("C","S","-","1","1","0","\n");
return 0;  }
```

14. Evaluate the following expressions using 2's complement arithmetic. Indicate overflows and underflows appropriately:
   (a) $3_{10} - 2_{10}$
   (b) $5_{10} - 6_{10}$
   (c) $4_{10} + 3_{10}$
   (d) $-4_{10} - 3_{10}$
   (e) $2_{10} + 7_{10}$

(f) $-5_{10} + -4_{10}$

15. What is the output of the following C program?

```
#include<stdio.h>
int main()  {
   float a;
   a = 1.2365;
   printf("%d\n",a);
   printf("%f\n",a);
   printf("%.2f\n",a);
   return 0;  }
```

16. What is wrong with the following C declaration?
`int float[5] = {0,0,0,0,0};`

17. Consider the following C program:

```
#include <stdio.h>
int main() {
 int a;
 printf("Enter the value for a:");
 scanf("%d", &a);
 if(a = 25)
   printf("a is 25");
 else
   printf("a is not 25");
 return 0;  }
```

For what values of a will the program output `a is not 25`?

18. What will be the output of the following program?

```
int main(){
 int x;
 x = 5;
 printf("%d %d %d",x, x<<2, x>>2);
 return 0;  }
```

19. What will be the output of the following program?

```
int main()  {
int x=20, y=35;
x = x++ + y++;
y = ++x + ++y;
printf("%d %d\n",x++,++y);
return 0;    }
```

20. Is the following `for` loop correct?

```
int main(){
int i,x,y=0,r,t=0;
x=56342;
for(i=0;x>0;i++)  {
 t = t+1;
 r = x%10;
 y = y*10+r;
 x = x/10;  }
printf("%d %d %d\n",x,y,t);
return 0;
}
```

If the answer is **yes** then what is the output?
If the answer is **no** then where is it wrong?

21. What is the output of `printf("%d");`?

22. What will be the output of the following code?

```
#include<stdio.h>
int main() {
 int i = 0 , a[5] ;
 a[i]= i++;
 printf("%d\n",a[i]);
 i=i--;
 printf ("%d\n",a[i]) ;
return 0; }
```

23. What is the output of the `printf` statements?

```
int main(){
  int array1 [8] = {2, 4, 6, 8, 10, 12, 14, 16,7};
  int array2 [] =  {2, 4, 6, 8, 10, 12, 14, 16,7};

  printf("%d/n"array1[8]);
  printf("%d/n"array2[8]);
  return 0;
}
```

24. Is the following C code segment correct?

```
for(int i=0,intj=0;i<10,j<5;i++,j++)
{
   printf("%d\n",i);
   printf("%d\n",j);
}
```

25. What is the URL of the course website?