Student number:_____

UNIVERSITY OF VICTORIA
Faculty of Engineering

Department of Computer Science

SEng 265 (Introduction to Software Engineering)
Instructor: Daniel M. German

Midterm
23 Oct. 2001

Duration: 45 minutes

No books or electronic devices are allowed

This examination paper consists of **8** pages and **3** sections. Please bring any discrepancy to the attention of an invigilator. The number in brackets at the start of each question is the number of points the question is worth.

Answer all questions.

Please write your answers clearly.

For instructor's use:

	Score
1 (15)	
2 (10)	
3 (35)	
Total (60)	

1. **Unix Questions**
This section is worth 15 points.

(a) [10] Attributes of files and how to run programs
Assume the following file structure in a hypothetical UNIX machine

Name	File Access Attributes	Owner	Group
/	`drwxr-xr-x`	root	root
/bin	`drwxr-xr-x`	root	root
/bin/program	`-r-xr-xr-x`	root	root
/home	`drwxr-xr-x`	root	root
/home/dmg	`drwx------`	dmg	users
/home/dmg/program	`-rw-------`	dmg	users
/home/dmg/bin	`drwx------`	dmg	users
/home/dmg/bin/program	`drwx------`	dmg	users
/usr/bin	`drwxr-xr-x`	root	root
/usr/bin/program	`-r-xr-x---`	root	root

also, assume your username is `dmg`, and you are not a member of the `root` group. The current value of your PATH is:

```
PATH=/home/dmg/bin:/usr/bin:.:/bin
```

and your current working directory is:

```
/home/dmg
```

you then try to execute the following command:

```
program 1 2 3
```

i. In which directory names, and which order, will the shell **try to find** the executable `program`? Provide full path names for each directory name.

ii. Give the full path name of the executable that the shell will run.

(b) [5] bash command history

Describe what the following shell-history commands expand to.

```
...
[dmg@aluminium]$ emacs my_program.c
[dmg@aluminium]$ history
 1120  cd /home/dmg
 1121  cd /home/dmg
 1122  history
 1123  cd /tmp
 1124  cd
 1125  emacs my_program.c
 1126  history
[dmg@aluminium]$ !-2
```

```
[dmg@aluminium]$ !c !*
```

```
[dmg@aluminium]$ !-3
```

```
[dmg@aluminium]$ !1122
```

```
[dmg@aluminium]$ !c
```

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2. bash Programming

This section is worth 10 points.

(a) [10] The following shell script is called test.bash

```
#!/public/bin/bash
variableA=(5 4 2 1 0 7 8 8 3)
variableB=($@)
echo $0
for variableC in ${variableA[@]}; do
   echo "$0" ’$variableC’ $variableB[$variableC]
done;
```

What is its output when it is run in the following way:

```
./test.bash abc cde fgh ijk lmn opq rst uvw xyz
```

3. C Programming

This section is worth 35 points

(a) [6] Building C expressions

To answer these questions you have the option to use any function in the C standard library.

For the following questions, assume the following declarations:

```
int i;
char c;
char word[20];
```

i. Write an expression that checks if the value of `c` is an uppercase alphabetic character (**A**...**Z**)

ii. Write an expression that checks if `i` is a multiple of 4 or `c` is a digit (**0..9**)

iii. Write an expression that checks if the 5th character of `word` is not a digit (**0..9**) and it is not a letter **b**.

(b) [6] Data types

Describe in your own words what are the types of the variables in the following declarations.

i. `char* a,b;`

ii. `int **variable1;`

iii. `long *variable2[5];`

(c) [8] Evaluating expressions

What are the values of `i` and `j` after each of the following statements?

i.
```
int i, j;
i = 0; j = 0;
```

i: _____ j: _____
```
j = 125 % 10;
```

i: _____ j: _____
```
i = (++i,j--);
```

i: _____ j: _____
```
i-=3;
```

i: _____ j: _____

ii.
```
int i,j;
int *p;
i = j = (0, 9 + 4 / 2 * 2);
```

i: _____ j: _____
```
p = &i;
```

i: _____ j: _____
```
*p = j?2:i;
```

i: _____ j: _____
```
j = *(p++);
```

i: _____ j: _____

(d) [15] What is the output of the following C program?

```
#include <stdio.h>
int a=0,b=0,c=0,d=0;
void Function(int a, int *b)
{
   int c;
   a++;
   *b = 5;
   c = 3;
   d = 9;
   printf("%d %d %d %d\n", a, *b, c, d);
}

void main(void)
{
   int d;
   a = 1;
   b = 3;
   c = 4;
   d = 2;
   printf("%d %d %d %d\n", a, b, c, d);
   Function(a, &c);
   printf("%d %d %d %d\n", a, b, c, d);
}
```

End of examination
Total pages: 8
Total marks: 60