

CSC 111 Fall 2011 Midterm 2

Your Name

UVicID

Instructions

- This midterm consists of 4 double-sided pages and 17 questions.
- The questions are worth 4, 6, or 8 points for a total of 100 points. The points are listed in square brackets at the end of the first line of the question.
- You have 70 minutes for this midterm. **Time management—approx. 4 minutes per question.**
- This midterm is closed-books, closed-notes, no calculators, no gadgets, and no electronic devices.
- Turn in your completed midterm at the front of the class; leave through the front door on your left.
- **Do not leave before 10:45 am.**

1. Consider the following syntactically correct C declarations and assignments. [8]

```
int a;
int d;
int *b;
int *c;
int** e;
a = 17; b = &a;
c = b; d = 19;
e = &c;
```

*e = &c, c = b, b = &a
c = &a*

What are the values of the following expressions?

(&a == c)

True ✓

(b == &d)

undefined ✓

(*c == 17)

True ✓

(**e == *b)

undefined ✗

(d == a)

undefined ✗

(*b == 19)

undefined ✓

(a == b)

type clash ✓

(&a == e)

undefined

- &c has its own address

2. Consider the following declarations: [6]

```
typedef struct {  
    int year;  
    int month;  
    int day;  
} Date;  
Date dob;  
Date *d = &dob;
```

Using variable `d` initialize `dob` with the following birthday July 1, 1867.

3

```
*d->year = 1867;  
*d->month = 07;  
*d->day = 1;
```

3. Consider the following declarations: [4]

```
int* ap;  
void* aq;
```

How do you assign `aq` to `ap` properly using a cast?

0

```
ap = (int*)aq;  
ap = (int)aq;
```


Consider the following syntactically correct C declarations and assignments. [6]

```
int a;  
int *b  
int **c;  
a = 17;  
b = &a;  
c = &b;
```

Using one **printf()** statement output the **address** of variable **b** and the **address** of variable **a**.

6
`printf("%8d %8d\n", c, b);`

5. In the C programming language, how do you refer to a file when you read, write or close a file? [4]



FILE*



fopen



printf



fgetc

6. What will happen if you execute the following C program? [4]

4

```
#include<stdio.h>  
#include<stdlib.h>  
int main(void) {  
    FILE *fp1,*fp2;  
    fp1 = fopen("day.txt", "r");  
    fp2 = fopen("night.txt", "r");  
    fclose(fp1, fp2);  
    return EXIT_SUCCESS;  
} /*main*/
```



Compile-time error



It will open two files in read mode



It will check whether the two files "day.txt" and "night.txt" exist



It will open two files in read mode and then close them.



7. What is the console output of the following syntactically correct C program? [6]

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
int main(void){
    char str[] = "Once upon a time there was a polar bear";
    FILE *ifp;
    FILE *ofp;

    ofp = fopen("vic.txt", "w");
    fputs("I live in Victoria!\n", ofp);
    fclose(ofp);
    ifp = fopen("vic.txt", "r");
    while(fgets(str, strlen(str), ifp) != NULL) printf("%s", str);
    fclose(ifp);
    return EXIT_SUCCESS;
} /* main */
```



Once upon a time there was a polar bear



vic.txt



I live in Victoria!



None of the above

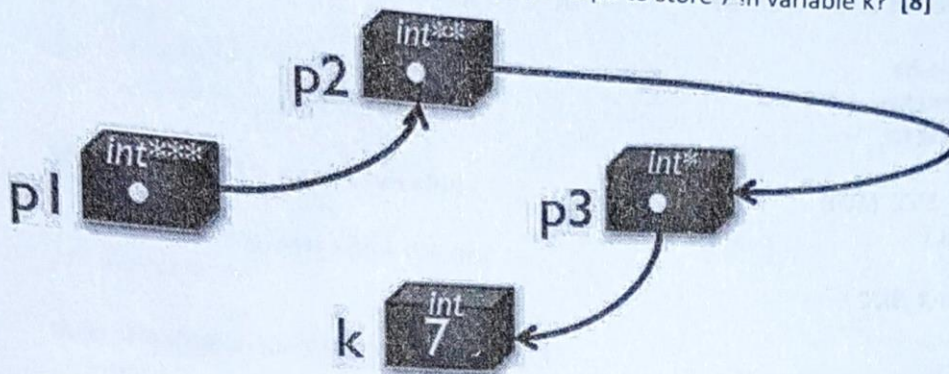
8. What is the output of the following syntactically correct C program? [6]

```
#include <stdio.h>
int main(void) {
    int k = 5;
    while (k < 12) {
        printf("%d ", k%7);
        k = k + 1;
    } /* while */
    printf("\n");
    return 0;
} /* main */
```

Output:

7

Realize the following memory configuration using C variable declarations and pointer assignments. Write three assignments using pointers p1, p2, and p3 to store 7 in variable k? [8]



int k;
 int p3;
 int *p2;
 int **p1;
 k = 7;
 p3 = &k;
 p2 = &p3;
 p1 = &p2;

10. Which of the following functions is used to read file on a char by char basis? [4]

- ☐ putc(int, FILE*)
- ☒ char* fgets(char*, int, FILE *)
- ☐ fscanf("format", args)
- ☒ int getc(FILE *)

11. Which of the following is **not** true? [4]

- ☒ Each component of a union is assigned the same chunk of storage space
- ☐ The syntax for unions is basically the same as for structures
- ☒ Each component of a union is of same type
- ☐ Unions are also called variant records

12. Insert a syntactically correct `printf()` statement into the following C code—where the box is—to output the **second to last** character of the string `s.str` using the length of the string. [6]

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
```

```
#define MAX_SIZE (100)
typedef struct {
    int length;
    char str[MAX_SIZE];
} StringDesc;
```

```
int main(void) {
    StringDesc s;
    strcpy(s.str, "Melanie Amaro of X FACTOR");
    s.length = strlen(s.str);
```

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```
int l = s.length - 2;
printf("%c\n", s.str[l]);
```

```
    return EXIT_SUCCESS;
} /* main */
```

13. What is the output of the following syntactically correct C program? [6]

0

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
int main(void) {
    char song2[] = "Listen Beyonce";
    /* strcmp() returns an int greater than, equal to, or less than 0, if the first string */
    /* is greater than, equal to, or less than the second string respectively. */
    if (strcmp(song2, "Beyonce Listen") == 0) printf("Beyonce\n");
    else printf("Amaro\n");
    return EXIT_SUCCESS;
} /* main */
```

Output:

Beyonce

11
4. What is the effect of the following initialization? [8]

```
#include <stdio.h>
#define vSize 3
typedef int Item;
typedef int index;
typedef Item Vector[vSize];
```

```
void initVector(Vector V, index size) {
    index k;
    for (k=0; k<size; k++) V[k] = (Item)k;
} /* initVector */
```

```
void printVector(const Vector V, index size) {
    index k;
    for (k=0; k<size; k++) printf("%d ", V[k]);
    printf("\n");
} /* printVector */
```

```
int main(void) {
    Vector Vec;
    initVector(Vec, vSize);
    printVector(Vec, vSize);
    return 0;
} /* main */
```

- 8
- ☐ 1 2 3
 - ☒ 0 1 2
 - ☐ 1 1 1
 - ☐ 0 0 0

15. How do you swap the values in variables **a** and **b** using the routine swap? [4]

```
void swap(int* x, int* y) {
    int tmp = *x; *x = *y; *y = tmp;
} /* swap */
```

- 4
- ☐ int a = 3, b = 17; swap(3, 17);
 - ☐ int a = 3, b = 17; swap(a, b);
 - ☒ int a = 3, b = 17; swap(&a, &b);
 - ☐ int a = 17, b = 3;
- 12

16. What is the output of the following syntactically correct C program? [8]

```
#include <stdio.h>
typedef float Vector[3];
void func1(Vector a, int len) {
    int k; float first = a[0];
    for (k=0; k<len-1; k++) { a[k] = a[k+1]; printf(" %.1f", a[k]); }
    a[len-1] = first; printf(" %.1f", a[len-1]);
} /*func1*/
int main(void) {
    Vector vec;
    vec[0] = 1.1; vec[1] = 5.5; vec[2] = 4.4;
    func1(vec, 3);
    return 0;
} /* main */
```

☐

1.1 4.4 5.5

☐

1.1 5.5 4.4

☒

5.5 4.4 1.1

☒

5.5 4.4

D

17. Write a syntactically correct C program to open two text files: an input file called **Beatles.txt** and an output file called **RollingStones.txt**. Copy the contents of file **Beatles.txt** to **RollingStones.txt**. Then close the files. [8]

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
```

```
int main(void) {
```

```
FILE *ifp
```

```
FILE *ofp
```

```
ifp = fopen("Beatles.txt", "r");
```

```
ofp = fopen("RollingStones.txt", "w");
```

```
fputs(beatles.txt, ofp);
```

```
fclose(ofp);
```

```
fclose(ifp);
```

```
}
```

4.5

1.5 8

4.5