

Assignment week 5

Exercise 1)

- (1) (Text answer) (Old exam question) A function `area` calculates and returns the area of a rectangle as an integer. The input rectangle is given as four integer coordinates: `x1, x2, y1, y2`. Complete the function signature below.

```
1
2
3 _____ ( _____ ) {
4
5     return (x2 - x1) * (y2 - y1);
6 }
```

Seeing as the function is supposed to calculate the area of a square, the function signature must have all coordinates defined to compute. It can be written as such:

```
int rect_area(int x1, int x2, int y1, int y2)
```

Exercise 2)

- (2) (Text answer) (Old exam question) The function `increment` takes a pointer to an integer and adds 1 to the integer value to which it points. The function does not return any value. Complete the function signature and function body below, so that the main function prints 6 when executed.

```
1
2
3 _____ ( _____ ) {
4
5
6     _____;
7 }
8
9 int main () {
10     int v = 5;
11     increment(&v);
12     printf("%d", v);
13     return 0;
14 }
```

The function is called by “incement” and the integer defined to 5 is “v”. Therefore, the function can be written as such:

```
int increment(int v) {
    v++;
}
```

Exercise 3)

- (3) (Text answer) Consider the following code. At the end of the function, what are the values for x , y , $*xp$, $*yp$? Using pen and paper, draw a diagram (like in the lectures) to explain your answer. Your submission must include your diagram. The following diagram formats are allowed: PDF, JPG and PNG.

```
#include <stdio.h>

int main(void)
{
    int x;
    int y;

    int *xp;
    int *yp;

    x = 5;
    y = x;

    xp = &x;
    yp = &y;

    x = 10;

    /* What are values of: x,y,*xp,*yp */

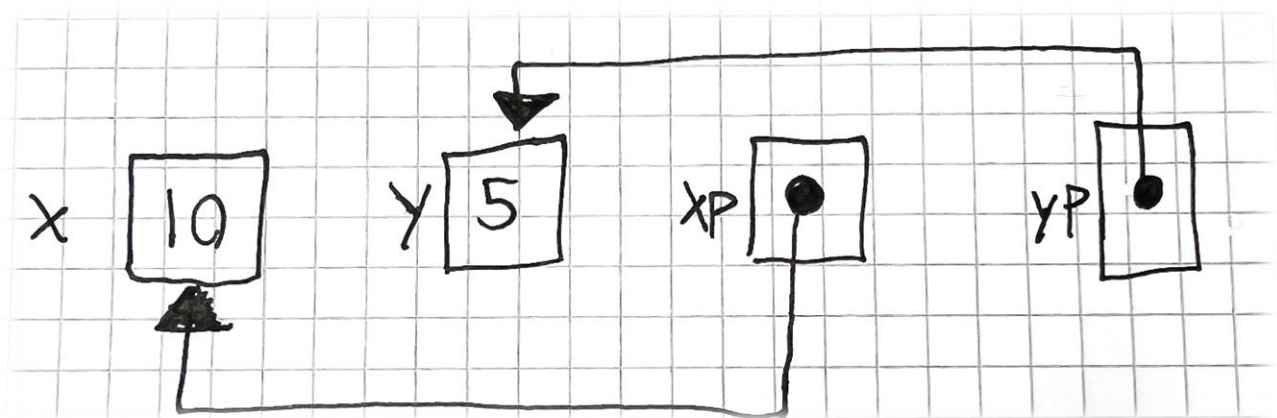
    printf("x=%d, y=%d, *xp=%d, *yp=%d\n", x,y,*xp,*yp);

    return 0;
}
```

The final values for x , y , $*xp$, $*yp$ are as follow:

| | | | | | | |
|----------|-----|---------|-----|------------|-----|-----------|
| $x = 10$ | $ $ | $y = 5$ | $ $ | $*xp = 10$ | $ $ | $*yp = 5$ |
|----------|-----|---------|-----|------------|-----|-----------|

Pointer diagram:



Exercise 4)

- (4) (Text answer) Consider the following code. At the end of the function, what are the values for x , y , $*xp$, $*yp$? Using pen and paper, draw a diagram (like in the lectures) to explain your answer. Remember to include your diagram (in PDF, JPG or PNG format) in your submission.

```
#include <stdio.h>

int main(void)
{
    int x;
    int y;

    int *xp;
    int *yp;

    x = 5;

    xp = &x;

    x = 10;

    y = *xp;

    yp = &y;

    *xp = 0;

    /* What are values of: x,y,*xp,*yp */

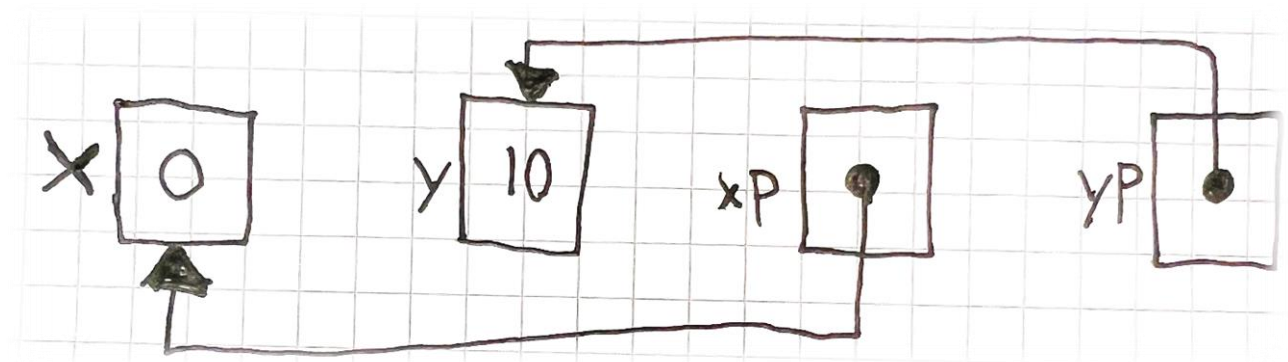
    printf("x=%d, y=%d, *xp=%d, *yp=%d\n", x,y,*xp,*yp);

    return 0;
}
```

The final values for x , y , $*xp$, $*yp$ are as follow:

| |
|---|
| $x = 0$ $y = 10$ $*xp = 0$ $*yp = 10$ |
|---|

Pointer diagram:



- (5) (Text answer) Once again, consider the following code. At the end of the function, what are the values for x , y , $*xp$, $*yp$? Using pen and paper, draw a diagram (like in the lectures) to explain your answer. Remember to include your diagram (in PDF, JPG or PNG format) in your submission.

```
#include <stdio.h>

int main(void)
{
    int x;
    int y;

    int *p1;
    int *p2;

    x = 5;
    y = 10;

    p1 = &x;
    p2 = p1;

    *p2 = y;

    p1 = &x;

    /* What are values of: x,y,*xp,*yp */
}
```

The final values for x , y , $*xp$, $*yp$ are as follow:

| |
|---|
| $x = 10$ $y = 10$ $*p1 = 10$ $*p2 = 10$ |
|---|

Pointer diagram:

