Compilation part 2:

Sean Assolin 311426118
Ori Tabibi 205508971
Hadar Atia 205518392

1) קיימת פונקציה main בקוד והיא יחידה.

```
1    function void main()
2    {
3        var int b;
4        b = 5;
5    }
6
7    function void main()
8    {
9        var int a;
10       a = 4;
11   }
```

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ ./file < test.txt

[line:7] Code should have only one Main
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$
```

2) main לא מקבל ארגומנטים והטיפוס שלה void.

```
1    function int main(int x)
2    {
3        var int b;
4        b = 5;
5        return 0;
6    }
```

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ ./file < test.txt
[line:1] Main type must be void not int
[line:1] Main function has no arguments
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$
```

```
 1    function int foo(){
 2        function void goo(int x, y){
 3            x = x + y;
 4        }
 5        function char goo(char c){
 6            c = 'f';
 7            return c;
 8        }
 9        return 1;
10    }
11
12    function real foo(){
13        return 3.15;
14    }
15
16    function void main(){}
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

Re-declaration of function (goo)
Re-declaration of function (foo)
2 Errors found
```

4) לא קיימים שני משתנים עם אותו שם באותו scope

```
1    function int foo(char y){
2        var int x, y;
3        var char x;
4        return 1;
5    }
6
7    function void main(){}
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

Re-declaration of variable (x)
Re-declaration of variable (y)
2 Errors found

sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ █

```
1   function int foo(char y){
2       function char goo(){
3           return 'c';
4       }
5       return 1;
6   }
7
8   function void main(){
9       foo();
10      foo('c');
11      goo();
12      foo1();
13  }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:9] Undeclared function (foo) with unmatching arguements
[line:11] Undeclared function (goo) with unmatching arguements
[line:12] Undeclared function (foo1) with unmatching arguements
3 Errors found
```

```
1    function int foo(char y){
2        var int* p;
3        *p = t;
4        t = 5;
5        y = 'f';
6        return 1;
7    }
8
9    function void main(){}
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:3] Undeclared variable [t]
[line:3] Assignment Error mismatch: can not assign undefined to INT
[line:4] Undeclared variable [t]
3 Errors found
```

מספר הארגומנטים האקטואליים שווה למספר הארגומנטים הפורמליים
של הפונקציה, כמות הארגומנטים בקריאה לפונקציה צריכה להיות שווה
לכמות הארגומנטים בהגדרת הפונקציה.

```
1    function int foo(int x, y;char z){
2        return 1;
3    }
4
5    function void main(){
6        foo();
7        foo(2, 3);
8        foo(2, 3, 't');
9    }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:6] Undeclared function (foo) with unmatching arguements
[line:7] Undeclared function (foo) with unmatching arguements
2 Errors found
```

8) טיפוסים של הארגומנטים בקריאה לפונקציה תואמים לטיפוסים בהגדרת הפונקציה.

```
1   function int foo(int* x, y;real* z){
2       return 1;
3   }
4
5   function void main(){
6       var int r, t;
7       var real q;
8       foo(&r, &t, &q);
9       foo(r, t, q);
10  }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/םידומיל/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/םידומיל/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/םידומיל/compilation'
./file < test.txt

[line:9] Undeclared function (foo) with unmatching arguements
1 Errors found
```

9) טיפוס הערך המוחזר מהפונקציה תואם לטיפוס ההחזרה המוכרז בכותרת של הפונקציה. וטיפוס ההחזרה של הפונקציה לא יכול להיות מחרוזת.

```
 1    function int foo(int x;char y){
 2        if(x > 5)
 3            return x;
 4        if(y == 'g')
 5            return y;
 6        return 3.5;
 7    }
 8
 9    function char* goo(){
10        return "hello";
11    }
12
13    function void main(){}
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:1] Function (foo) return invalid value
[line:9] Function (goo) return invalid value
2 Errors found
```

טיפוס הערך המוחזר מהפונקציה תואם לטיפוס המשתנה שלתוכו נכנס הערך שמוחזר מהפונקציה.

```
 1    function int foo(int x;char y){
 2        return 3;
 3    }
 4
 5    function int* goo(){
 6        var int* x;
 7        *x = 5;
 8        return x;
 9    }
10
11    function void main(){
12        var int x;
13        var char y;
14        var int* ptr;
15        x = foo(x, '$');
16        y = foo(x, '$');
17        x = goo();
18        ptr = goo();
19    }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:16] Assignment Error mismatch: can not assign INT to CHAR
[line:17] Assignment Error mismatch: can not assign INT* to INT
2 Errors found
```

```
 1    function void main(){
 2        var int x;
 3        var bool y = true;
 4        if(x > 5){
 5            x = 4;
 6        }
 7        if(y){
 8            if(x + 3){
 9                x = 6;
10            }
11        }
12        if(false)
13            y = false;
14        if('g'){
15            x = 4;
16        }
17    }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:8] IF-condition must return type BOOL
[line:14] IF-condition must return type BOOL
2 Errors found
```

12) טיפוס התנאי ב while , ב- do-while וב- for -הוא מטיפוס bool

While:

```
 1    function void main(){
 2        var int x = 3;
 3        var bool y = true;
 4        while (y){
 5            x = 4;
 6        }
 7        while (x == 4){
 8            x = 4;
 9        }
10        while (true && y)
11            y = false;
12        while ('g'){
13            x = 4;
14        }
15        while(5 + x){
16            y = true;
17        }
18    }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:12] WHILE-condition must return type BOOL
[line:15] WHILE-condition must return type BOOL
2 Errors found
```

Do-while:

```
 1    function void main(){
 2        var int x = 3;
 3        var bool y = true;
 4        do {
 5            x = 4;
 6        } while (y);
 7        do {
 8            x = 4;
 9        } while (x == 4);
10        do{
11            y = false;
12        } while (true && y);
13        do {
14            x = 4;
15        } while ('g');
16        do{
17            y = true;
18        }while(5 + x);
19    }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL

sean@DESKTOP-17AKS3Q:/mnt/d/פיתוחי/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/פיתוחי/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/פיתוחי/compilation'
./file < test.txt

[line:15] DO-WHILE-condition must return type BOOL
[line:18] DO-WHILE-condition must return type BOOL
2 Errors found

For:

```
1   function void main(){
2       var int i;
3       var int x = 0;
4       var bool y = true;
5       for(i = 0;i < 10;i = i + 1){
6           x = x + 5;
7       }
8       for(i = 'f';i < 10;i = i + 1){
9           x = x + 6;
10      }
11      for(i = 0; i ;i = i + 1){
12          x = x + 7;
13      }
14      for(i = 0;i < 10;i = y){
15          x = x + 8;
16      }
17      for(i = 0;i < 10 && y || false;i = i + 1){
18          x = x + 5;
19      }
20  }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/זמודיר/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/זמודיר/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/זמודיר/compilation'
./file < test.txt

[line:8] Assignment Error mismatch: cannot assign CHAR to INT
[line:8] FOR-init must initialized with type INT
[line:11] FOR-condition must return type BOOL
[line:14] Assignment Error mismatch: cannot assign BOOL to INT
[line:14] FOR-increment must return type INT
5 Errors found
```

טיפוס הביטוי המופיע כאינדקס ב– [] של מחרוזת הוא מטיפוס
int.

```
 1    function void main(){
 2        string s[10];
 3        string s1['d'];
 4        var int x = 2;
 5        var char y = 'd';
 6        s[x] = 'g';
 7        s[x + 5] = y;
 8        s[y] = 'v';
 9        s[3.5] = 'z';
10        s[4] = s['d'];
11        s[2] = s[3];
12    }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

sean@DESKTOP-17AKS3Q:/mnt/d/סימודרים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/סימודרים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/סימודרים/compilation'
./file < test.txt

[line:3] Size of string must be type INT not CHAR
[line:8] Size of string must be type INT not CHAR
[line:9] Size of string must be type INT not REAL
[line:10] Size of string must be type INT not CHAR
[line:10] Assignment Error mismatch: must assign CHAR to cell of string array not NULL
5 Errors found

```
1    function void main(){
2        string s[10];
3        var int x = 2;
4        var real* y;
5        s[x] = 'g';
6        x[4] = 4;
7        y[x] = 'r';
8    }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:6] INT can not have index
[line:7] REAL* can not have index
2 Errors found
```

(15   טיפוס של המשתנה מצד שמאל של האופרטור השמה (=)
תואם לטיפוס הביטוי מצד ימין. לתאים של המחרוזת מותר להכניס רק
תווים ו NULL יכול להיות רק מטיפוס מצביע ל – real, char , int.

```
1    function void main(){
2        string s[10];
3        var int x = 2;
4        var real r = 3.5;
5        var real* y = null;
6        var bool z = 2;
7        var bool z1 = true;
8        s[x] = 'g';
9        s[4] = 4;
10       z1 = 3.15;
11       x = null;
12       *y = 3.5;
13       y = &r;
14       y = null;
15       y = &z1;
16   }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:6] Assignment Error mismatch: can not assign INT to BOOL
[line:9] Assignment Error mismatch: must assign CHAR to cell of string array not INT
[line:11] Assignment Error mismatch: can not assign NULL to INT
[line:15] Can not perform & on [BOOL] - [&z1]
4 Errors found

טיפוסים בביטויים expressions תואמים.

עבור (+ - * /)

```
1    function void main(){
2        var int x = 2;
3        var real r = 3.5;
4        var char c = 'g';
5        x = x + 1;
6        r = 3.15 - x;
7        r = c * 8;
8        x = c / 2;
9    }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:7] Can not perform [*] between [CHAR] and [INT] - [c * 8]
[line:7] Assignment Error mismatch: can not assign NULL to REAL
[line:8] Can not perform [/] between [CHAR] and [INT] - [c / 2]
[line:8] Assignment Error mismatch: can not assign NULL to INT
4 Errors found
```

עבור (&& ||)

```
1    function void main(){
2        var int x = 2;
3        var bool r = true;
4        r = (r == false) && (x > 4);
5        r = (x || 4);
6    }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:5] Can not perform [||] between [INT] and [INT] - [x || 4]
[line:5] Assignment Error mismatch: can not assign NULL to BOOL
2 Errors found
```

עבור (<= ,>=, <, >)

```
1    function void main(){
2        var int x = 2;
3        var real y = 3.5;
4        var bool r = true;
5        r = x > 2;
6        r = 5 < 9;
7        r = (x <= y);
8        r = (r >= false);
9    }
```

עבור (== ,!=)

```
1    function void main(){
2        var int x = 2;
3        string s[10] = "hello";
4        var int* y = null;
5        var bool r = true;
6        r = x == 2;
7        r = 5 != 9;
8        r = s[1] == s[5];
9        r = x == true;
10       r = y != x;
11       r = *y == x;
12   }
```

עבור ( ) , ! | length |)

```
1    function void main(){
2        var int x = 2;
3        string s[10] = "hello";
4        var int* y;
5        var bool r = true;
6        x = |s|;
7        r = |s|;
8        *y = |s| + 5;
9        r = !true;
10       r = !x;
11   }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/מידומיל/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/מידומיל/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/מידומיל/compilation'
./file < test.txt

[line:7] Assignment Error mismatch: can not assign INT to BOOL
[line:10] Can not perform ! on [INT] - [!x]
[line:10] Assignment Error mismatch: can not assign NULL to BOOL
3 Errors found
```

17) אפשר רק להוסיף או להפחית int ממצביע.

```
1    function void main(){
2        var int x = 2;
3        var real* y = null;
4        var char* t = null;
5        y = y - x;
6        t = t + 2 + 3;
7        t = t - 3.5;
8        y = y * x;
9    }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/מידומיל/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/מידומיל/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/מידומיל/compilation'
./file < test.txt

[line:7] Can not perform [-] between [CHAR*] and [REAL] - [t - 3.5]
[line:7] Assignment Error mismatch: can not assign NULL to CHAR*
[line:8] Can not perform [*] between [REAL*] and [INT] - [y * x]
[line:8] Assignment Error mismatch: can not assign NULL to REAL*
4 Errors found
```

```
1    function void main(){
2        var int x = 2;
3        var int* y = null;
4        string s[10] = "hello";
5        var char* p;
6        p = &s[5];
7        y = &x;
8        s[4] = &y;
9        p = &s;
10   }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:8] Can not perform & on [INT*] - [&y]
[line:8] Assignment Error mismatch: must assign CHAR to cell of string array not NULL
[line:9] Can not perform & on [STRING] - [&s]
[line:9] Assignment Error mismatch: can not assign NULL to CHAR*
4 Errors found
```

אופרטור אונרי * מופעל רק על מצביעים.

```
 1    function void main(){
 2        var int x;
 3        var int* y;
 4        var char* t;
 5        var char z;
 6        *y = 9;
 7        x = *z;
 8        y = *(x - 5);
 9        *t = 'y';
10        x = *(y - 5);
11    }
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
sean@DESKTOP-17AKS3Q:/mnt/d/לימודים/compilation$ make run
make all
make[1]: Entering directory '/mnt/d/לימודים/compilation'
lex -o lex.yy.c src/file.l
yacc -d -o y.tab.c src/file.y
cc -o file y.tab.c -ll -Ly
make[1]: Leaving directory '/mnt/d/לימודים/compilation'
./file < test.txt

[line:7] [CHAR] is not pointer
[line:7] Assignment Error mismatch: can not assign NULL to INT
[line:8] [INT] is not pointer
[line:8] Assignment Error mismatch: can not assign NULL to INT*
4 Errors found
```