function BARABASIALBERT(number of nodes n, degree d,
number of operations o, offset exponent $x = 1$)
$D \leftarrow \text{REP}(0, n)$ ▷ All nodes start with 0 degree
$T \leftarrow \text{REP}(\{\}, n)$ ▷ List of targets of each node
$S \leftarrow \text{REP}(\{\}, n)$ ▷ List of sources of each node
$O \leftarrow (\,)$ ▷ Variable to store the generated operations in
procedure ADDEDGE(node i, node j, add as operation b)
$D[i] \leftarrow D[i] + 1;\ D[j] \leftarrow D[j] + 1$ ▷ Update degrees
$T[i] \leftarrow T[i] \cup \{j\};\ S[j] \leftarrow S[j] \cup \{i\}$ ▷ Update targets and sources
if b **then**
$O \leftarrow O + (\text{ADD}, (i, j))$
end if
end procedure
procedure REMOVEEDGE(node i, node j, add as operation b)
$D[i] \leftarrow D[i] - 1;\ D[j] \leftarrow D[j] - 1$ ▷ Update degrees
$T[i] \leftarrow T[i] \setminus \{j\};\ S[j] \leftarrow S[j] \setminus \{i\}$ ▷ Update targets and sources
if b **then**
$O \leftarrow O + (\text{REM}, (i, j))$
end if
end procedure
procedure ADDNODE(node i, add as operations b)
$C \leftarrow \{j \mid 0 \leq j < i \wedge j \notin S[i]\}$ ▷ Select candidate neighbours
$W \leftarrow (D[C] \,/\, \Sigma D[C])^x$ ▷ Calculate weights for preferred attachment
$X \leftarrow$ sample d neighbours from C with weights W
for $j \in X$ **do**
ADDEDGE(i, j, b)
end for
end procedure
procedure REMOVENODE(node i, add as operations b)
while $|T[i]| > 0$ **do**
$j \leftarrow \text{HEAD}(T[i], 1)$
REMOVEEDGE(i, j, b)
end while
end procedure
for $i \in \{1\,..\,m\}$ **do**
for $j \in \{0\,..\,i-1\}$ **do**
ADDEDGE(i, j, false) ▷ Start with $m + 1$ complete graph
end for
end for
for $i \in \{m+1\,..\,n-1\}$ **do**
ADDNODE(i, false) ▷ Add the rest of the nodes
end for
$G_0 \leftarrow \{(i, j) \mid i \in \{0\,..\,n-1\} \wedge j \in N[i]\}$ ▷ Initial network
while $|O| < o$ **do** ▷ Modify network until O is sufficiently large
$i \leftarrow$ Sample 1 index from $\{0\,..\,n-1\}$
REMOVENODE(i, true)
ADDNODE(i, true)
end while
$O \leftarrow \text{HEAD}(O, o)$
return (N_0, O) ▷ Return the initial network and o operations
end function